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ROYAL COLLEGE OF
DENTAL SURGEONS OF ONTARIO.

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# HAYES' PROCESS OF GENERATING AND APPLYING ANÆSTHETICS, THE MOST IMPROVED.

BY DR. FREDERICK GAERTNER, A. M.,
PITTSBURGH, PA., U. S. A.

The wonderful superiority of this new process and apparatus over and above everything else in use, is manifest and paramount.

The various methods of generating and applying anæsthetics to human beings has already baffled the minds of all eminent surgeons and scientists, both of America and Europe ; not only for the comfort and safety of his patient, but especially to the surgeon as well, all ways and means were adapted in applying this powerful process, now so commonly called "anæsthesia."

The value of anæsthetics, properly applied, in surgical and dental operations is so great, and the results produced so vital, that I wish to emphasize its practical application and utility as strongly as possible. The surgeon and dentist's great success largely depends upon him, as to whether or not he can properly, with safety, and without ill after effects anæsthetize his patient.

I can say here without an iota of doubt that "Hayes' Process of generating and applying Anæsthetics" is the most reliable and complete; principally on account of its simplicity, implicitly and efficiency.

The *absolute safety*, which consists in producing a light, agreeable, attenuated vapor or gas, having the necessary properties to support respiration and life, and in putting the regulation of the percentage of the narcotic under the complete control, in every respect, of the administrator, so as to be adapted to meet the wants or needs of every patient in all the various stages of anæsthesia; and also, in having a reliable thermometer attached to the apparatus, by which the capacity and power of the atmosphere to receive, contain and convey a certain percentage of any given narcotic in the anæsthetic, may be known at all times, while being administered; and further, not only its *safety*, but its efficiency, consists in having a water bath with heating power combined, by which the tendency to lower the temperature of the vapor by the continuous passage of the air through and over the narcotic, is not only counteracted, but by which an *increase* of the temperature of the vapor is obtained, so as to meet the ever-varying wants of the patient perfectly in the advancing stages of anæsthesia.

Its *desirable effects*, being entirely pleasant in respiration and rather enticing than otherwise, non-irritating to the fauces, the epiglottis, the mucous membrane of the bronchial tubes, and the air cells of the lungs, and being free from producing nausea with the consequent fearful results of vomiting, asphyxia, syncope or death, may be divided into the following four advantages.

1. In its adaptation to a *uniform* evaporation of all the elements in any *narcotic admixture*.

2. In its *cleanliness*, being perfectly clean at all times and under all circumstances.

3. In its convenience, the narcotic chamber being always charged and ready for use, and the apparatus being suitably suspended with pulleys and weight (Fig. 1), by which it is conveyed out of the surgeon's way when operating, or deposited in a tin cup, screwed to the wall, or enclosed in a neat surgeon's portable case (Fig. 3), for use out of office, which also contains three suitable bottles, one for the narcotic and two for stimulants, which should *always* be convenient of access during a surgical operation.

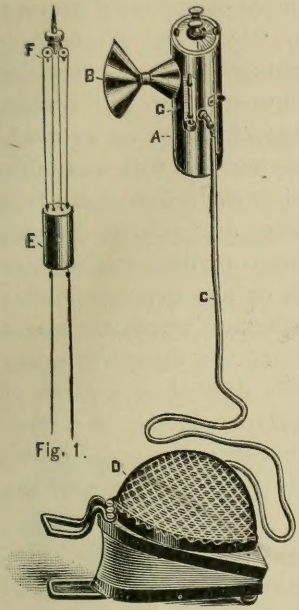

Fig. 1.

Fig. 2.

### EXPLANATION TO FIG. I.

F—Pulleys.
E—Weight.

### EXPLANATION TO FIG. 2.

A—Generator.
D—Aërator.
C—Rubber tube connecting aerator with generator.

4. In its *cheapness*, or the saving of the narcotic, and the consequent *annoying effects* of its waste in the operating rooms.

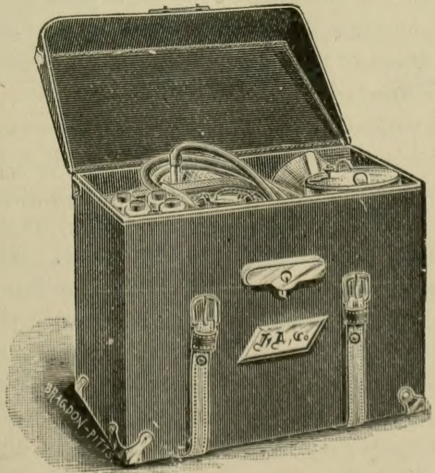

Fig. 3.
NEAT PORTABLE SURGEON'S CASE.

The *key* to the *arcana* in the development of this new process was the recognition of the fundamental or *"bed rock"* principle—that free oxygen is the only life-giving principle and that the atmosphere is the only element under heaven that will sustain respiration and life, and consequently, that *there can be no anæsthetic* without a proper admixture of atmospheric air with a suitable narcotic—except it be *locally applied*; and further that there is a *vast* and *appalling* difference between mere asphyxiating agents, such as carbonic acid, carbonic oxide, nitrous oxide or olifiant gas and an *anæsthetic*. The former suspends or abrogate the forces and functions of life to produce insensibility and unconsciousness by asphyxia, the latter sustains the force of life by contributing the life-giving principle (oxygen) properly diluted in a state of admixture as found in the air, with a suitable narcotic, thus producing insensibility and (if desired) unconsciousness, not by asphyxia or syncope, but by narcotizing the nervous system of the patient or subject.

Having recognized these *immutable* and *uncontrovertible facts*, and having also discovered that the exciting, irritating and nauseating effects of ether, chloroform and other suitable narcotics, as well as their choking and smothering sensations, and their danger of causing asphyxia, syncope or death, are *clearly attributed* to the heavy globules or the moisture of the vapor and the excessive proportion of the narcotic in the anæsthetic, over and above the powers of endurance of the patient, he studiously devised this new Process of *generating anæsthetic* attenuated *vapors or gases*, (see Fig. 4), and of aerating and applying the same under pressure, with the use of his suitable Apparatus in such a manner, as to obviate these unpleasant and dreadful results, and at the same time, meet the wants or needs of every patient or subject in every condition of life, while being anæsthetized. This is accomplished by passing currents of air through the liquid narcotic for the purpose of evaporating and simultaneously producing swift counter currents of air, by an air-forming device; thus disturbing, dividing and destroying the globules of the vapor, and producing a light, agreeable attenuated vapor or gas, having the necessary properties to support respiration and life. This attenuated vapor is still further diluted or the proportion of the narcotic in the Anæsthetic, diminished by the same air-forcing device, and the adjustment of a sheath (N) over the tube in which the air is forced, both tube and sheath having an opening (N) for the passage of the air, at the same time registering the percentage of the narcotic in the anæsthetic by means of a dial and index (H) on top of the generator. The importance of the *regulation* and the *registration* of the temperature of the vapor by the use of the bath (G), the thermometer (R), and index and dial (H), as the anæsthetics is being administered, is apparent, when we consider that the full capacity of the atmosphere at 40° Fahr. to contain chloroform, is limited to 6 per cent., while the atmosphere at 60° Fahr. can contain 12 per cent., which may be sufficient to kill a patient.

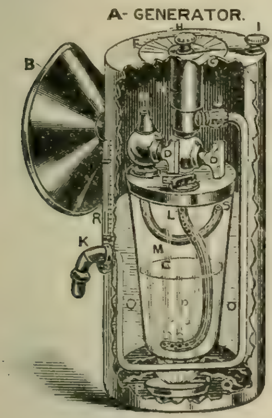

Fig. 4.

## EXPLANATION TO FIG. 4.

A—Generator.
P—Face piece.
M—Narcotic chamber,
C—Narcotic.
R—Elbow, secured to tube leading through the bath.
J—Swivel connecting tubes.
D—Stop cock.
L—Tube conveying air to the narcotic chamber.
S—Conveying anæsthetic to R.
Faucet—
N—Sheath.
F—Dial.
G—Index.
H—Knob for regulating percentage.
I—Place for inserting water in bath.
E—Place for inserting narcotic in chamber.
Q—Lamp.
Black R—Thermometer.

In the use of chloroform, by this process and apparatus, you regulate the temperature to 70° in the winter, and to 60° in the summer. In the use of Hayes Hypnotic you regulate to 90° in winter and 80° in summer. In the use of ether you regulate to 100° in the winter, 90° in the summer, and then multiply the figures on the dial by 2. In the use of the A. C. E. mixture you regulate to 80° in the winter and 70° in the summer. In this we give the temperature of the generator for extreme cold and extreme warm weather. In spring or autumn, or when the temperature of the room is about 55°, heat to 5° lower than in winter.

The Chloroform Committee, of the Royal Medical and Chirurgical Society, of London, recommends: that "in order that it may be administered with comparative safety, it is necessary that the proportion of vapor should not exceed 3½ per cent." But, we say, that the anæsthetic should not contain more than 1 per cent. of chloroform for the average patient to begin, and then increase gradually.

Yet we must bear in mind, that the percentage of any narcotic in the anæsthetic, must be regulated to suit the condition and wants of every patient in every stage of the anæsthesia. As Dr. Sansom—in his interesting treatise on chloroform—says: "We should be as careful to dilute our chloroform with atmospheric air, as we are to dilute the hydrocyanic acid which we administer to the stomach with a sufficiency of water, and that we should no more excuse the administration of an indefinite proportion of chloroform, than we should excuse the dispensing of a potent medicine without weighing it in a counter-balance, or measuring it in a graduating vessel." And as the eminent Dr. Richardson, in one of his lectures, beautifully and forcibly demonstrated, said—"To give chloroform on a linen rag, a piece of lint or a sponge, is at once as *unscientific* as it is *wasteful*, and as *wasteful* as it is *unsafe*." Now what is so truthfully said of chloroform is equally applicable to the use of any other narcotic.

By this new process and improved apparatus, he provides for the reduction of the proportion of chloroform, ether, or any other narcotic, to less than one per cent. in the Anæsthetic, and for an increase of the narcotic to any desired percentage; and also, he provides for the acquisition of a knowledge of an approximate percentage of the narcotic, while administering the Anæsthetic.

At the same time, we would have you bear in mind that chloroform, ether, bichloride of methylene, hydrobomic ether, etc., are not in themselves anæsthetics, that they are only narcotics, producing either exciting, sedative, sporific or iodide effects, the character of the effects depending principally upon the stage of the anæsthesia, and that, in fact, he *makes a superior anæsthetic*, by this process of forced evaporation, attenuation and dilution with the atmosphere at a suitable temperature, and at the same time administer the anæsthetic with just the *needed percentage* of the narcotic selected at each succeeding moment in the progress of anæsthesia.

Consequently, to any scientific and philanthropic mind, his discovery and invention must appear—*in its true light*—to be as much more *important* than Morse or Edison's, than humanity itself is more important than the mere conveniences of humanity.

We commend this new "Process of Anæsthesia" with its appropriate apparatus, to the medical and dental fraternities, with the hope that as you value life and health above everything else, you will not endanger the health and lives of your patients, nor throw yourself liable to prosecution for *male-practice* or *criminal neglect* in the administration of an anæsthetic by the ordinary methods.

Any surgeon, who has a large practice requiring the use of an anæsthetic, can save the cost of his outfit for this purpose in one year's time, by the use of this process and apparatus, as he saves fully seven-eighths of the narcotic he would use, by any of the ordinary methods of administering ether or chloroform, besides having all the other advantages which we claim for our process.

The generator (A) and face piece (P) are made of brass and nickel-plated, and are suspended on pulleys with screws attached, which are also nickel-plated, and are to be secured to the ceiling or deposited in a cup secured to the wall. The whole apparatus is made and finished in a style so as to be an ornament to any office.

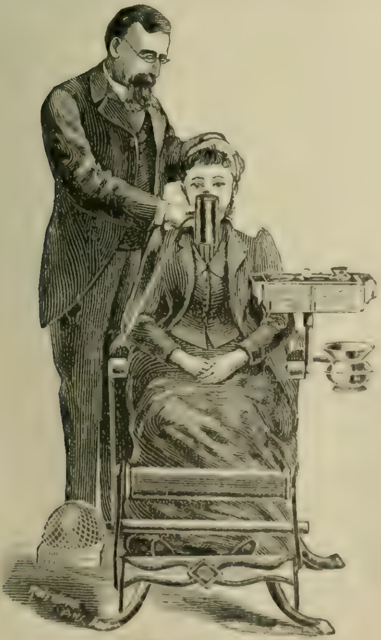

Fig. 5.

**EXPLANATION TO FIG. 5.**

A complete view of Hayes' Process of generating and applying Anæsthetics as is seen when in full operation.

# THE PRESENT CONDITION OF ANTISEPTIC SURGERY.*

BY SIR JOSEPH LISTER.

At the International Congress, in London, in 1881, Robert Koch demonstrated in King's College his then new method of cultivating microbes upon solid media. The illustrious veteran Pasteur was present at the demonstration; and at its conclusion exclaimed: "C'est un grand progres, Monsieur." How vast have been the extensions of our knowledge which have resulted from that great step in advance! Of these none perhaps have been more striking than Koch's own brilliant discovery of the cholera microbe; picked out with unerring precision by his beautiful method from among the multitude of bacteric forms that people the intestinal contents, and grown and studied with as much definiteness as if it were a cabbage or a rose.

But while we have during the last nine years learned so much more of the nature and habits of the micro-organisms which invade our bodies, a new and surprising light has been thrown within the same period upon the means by which the living animal defends itself against their assaults. This we owe to the eminent naturalist Metchnikoff, who, having long carefully studied intracellular digestion in the amoeboid cells which form the main mass of the bodies of sponges and other humble organisms, was prepared to observe and rate at its true value an analogus process in the wandering leucocytes of vertebrata. He found that these migratory cells, with whose amoeboid movements we have been long familiar, feed also like amoebae, and while almost omnivorous in their appetites, have a special fondness for bacteria; taking them into their protoplasmic substance and digesting them, thus preventing their indefinite propagation among the tissues. The cells which exercise this devouring function he termed phagocytes.

Various objections have been urged against Metchnikoff's views; but so far as I am able to judge, he has met these effectively by his masterly series of researches; and his observations have been confirmed and extended by several independent investigators. For the sake of those among my audience who may chance not to be familiar with Metchnikoff's work, I am tempted to relate briefly some of his experiments. The green frog, below the temperature of 28 C. (68 F.), is incapable of taking anthrax: the bacilli of that disease cannot grow when introduced under the skin of that animal. To what was this immunity of the frog to anthrax due? Were its juices an unfit pabulum for the microbe, or was the phagocytic action of its leucocytes the explanation? In the hope of solving this question Metchnikoff formed a tiny bag out of the pith of the reed, and having placed in it some spores of anthrax, closed the bag and inserted it beneath a frog's skin. The pith wall of the bag allowed the animal's lymph to penetrate by diffusion, but excluded the leucocytes; and the result was that the spores sprouted and grew into luxuriant threads of anthrax in the lymph, which was thus proved to be a suitable medium for the growth of the bacillus. Meanwhile under another part of the skin of the same frog had been placed a small piece of the spleen of an animal that had just died of anthrax and contained the microbe in its most virulent form; but there, the leucocytes having free access, no growth occurred.

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*Address delivered before the Tenth International Medical Congress, Berlin, August, 1890.

Another experiment on the same principle was still more instructive. It consisted in introducing the spores of anthrax into the anterior chamber of the eye of the frog, which, as we have seen, is naturally insusceptible of the disease, and also into that of a sheep and of a rabbit made insusceptible of it artificially by "vaccination" with Pasteur's attenuated virus. The aqueous humor of the healthy eye contains few, if any, leucocytes to interfere with the perfect transparency essential to vision. Accordingly the spores sprouted and grew for a while freely in the anterior chamber. Meanwhile the growth of the bacillus occasioned irritation to the eye, resulting in the immigration of a constantly increasing number of leucocytes, producing turbidity and in time hypopyon. If a drop of the aqeous humor was withdrawn at an early period after the commencement of the experiment and examined with the microscope, it was found to contain anthrax baccilli; some of them free in the liquid, but others enclosed in the bodies of leucocytes. But a drop taken after a longer period had elapsed showed no free baccilli, all being now within the leucocytes and exhibiting signs of degeneration in various degrees as the result of their advancing digestion. Finally the anthrax disappeared entirely and the eye cleared up, the animal in all cases remaining healthy, although inoculation into the aqueous humor proved a peculiarly deadly mode of infecting a susceptible animal.

Here we see that the inflammation excited by the microbe becomes, through the medium of the leucocytes, the cause of its destruction. How little can the lamented Cohnheim have dreamed that his observation of the emigration of leucocytes in inflammation would prove to have so far-reaching a bearing upon the pathology of infective diseases.

I have brought before you two samples of the kind of evidence upon which the phagocyte theory rests ; and if we accept it, as I believe we must, it serves at once to explain much that has hitherto been mysterious in the relations of micro-organisms to wounds. Take for example that which the surgeon makes for the cure of harelip. Its posterior edge is perpetually bathed with the saliva, which contains many kinds of septic bacteria. But these do not enter and people the fibrin that glues together the cut surfaces, as they infallibly would do if those surfaces were composed of glass or any other chemically inert material destitute of life. It has long been very evident that the living tissues exerted a potent influence in checking bacteric development in such a wound ; but what was the nature of that influence ? This used to be an enigma, but now receives its natural explanation in the phagocytic action of the cells that crowd the lymph soon after its effusion.

At the London Congress I brought forward an experiment which proved that a blood-clot within the body may exert a powerful anti-bacteric agency. I will not repeat the details of that experiment further than to say, that a very small piece of linen cloth soaked with putrid blood was mounted by means of silver wire in the interior of a short glass tube open at both ends, which was slipped into the jugular vein of a donkey and kept in position between two ligatures. After two days the venous compartment was removed and the coagulum within it investigated. In and near the glass tube it was in a state of advanced putrefaction, as was indicated by its foul odor and greatly altered appearance ; and microscopic examination showed that it abounded with bacteria. But near the wall of the vein it looked to the naked eye like a recent clot ; I could not detect in it any putrid odor nor could I discover bacteria with the microscope.

Stained sections of these outer parts of the coagulum, made after hardening in alcohol, showed great multitudes of cells differing from one another in size and other characters just as is often the case with Metchnikoff's phagocytes. I supposed that these cells must have been in some way or other the anti-bacteric agents; but how, I could not imagine. The phagocyte theory clears up the mystery.

By means of this same theory we can account for what would otherwise have seemed to me incomprehensible—the use, without evil consequences, of silk ligatures which have not been subjected to any antiseptic preparation. We learn from the experiments of Ziegler and others that leucocytes soon penetrate very thin spaces between plates of glass or other chemically inert foreign bodies inserted among the tissues. And we can understand that they may creep into the intervals between the fibres of a silk thread and destroy any microbes that may have lodged there, before they have had time to develop serious septic mischief. But there must surely be a limit to the thickness of the threads. No one, I imagine, would feel justified in leaving in the peritoneal cavity an unsterilized cord as thick as a finger. Mr. Bantock, whose remarkable series of successful ovariotomies may seem to justify his practice, does not, I believe, prepare his ligatures antiseptically; and I understand that he uses, for tying the pedicle of the tumor, silk twist of so strong a nature that it can be trusted to bear the needful strain with a diameter of only about 1-30 inch. But it would surely be wiser to sterilize even so slender a cord. Who can say that septic mischief may not occasionally lurk in the ligature in a form which may baffle the phagocytes?

The success in abdominal surgery, achieved by Bantock and Lawson Tait, without, as it is said, the use of antiseptic means, proves a stumbling block to some minds. But in truth the practice of these surgeons is by no means conducted without antiseptic precautions; nor would they, I am persuaded, desire that such an impression should prevail. Both are scrupulously careful in the purification of their sponges; and if there is one thing more important than another in the antiseptic management of wounds of the peritoneum, it is the avoidance of impure sponges. Both observe the strictest cleanliness, which is surely an antiseptic precaution; for it owes its virtue to the fact that it presents the septic organisms in the smallest possible numbers and thus reduces their power for evil to the utmost that can be done by any measures that are not germicidal. Both these surgeons also wash out the peritoneum with water, so as to get rid of coagula without injuring the peritoneal surface by rubbing it with sponges ; and this is done in order to avoid the risk of sepsis in residual clots. The drainage of the peritoneum is another antiseptic measure, and Mr. Bantock, I am informed, has the sponges which absorb the serum, wrung out of sulphurous acid and changes them very frequently.

This is a department of surgery in which I have had but little personal experience. But I can see that while the measures to which I have referred are, so far as they go, highly valuable, it must be in itself a very desirable thing to avoid the direct application to the peritoneum of strong and irritating antiseptic solutions. But now that we are all agreed that microbes are the evil with which we have to contend, it is surely wiser to ensure by germicidal means their entire absence from our hands and instruments, rather than trust to the most perfect cleanliness in the ordinary sense of the term. And if water is used for washing out the peritoneum, prudence seems to me to dictate that it ought to be freed from living organisms if this can be done without making it irritating. This object is, I believe, aimed at by Mr. Bantock by boiling the water before using it ; but I would advise as more effectual an extremely weak solution of corrosive sublimate, such as one in ten thousand, which, as Koch has taught us, may be implicitly trusted as aseptic, while it is not appreciably irritating and involves no risk of mercurial poisoning.

In general surgery the direct application of strong antiseptic solutions is not attended with the same disadvantages as in operations in the peritoneal cavity. My practice for some time past has been to wash the wound, after securing the bleeding points, with a pretty strong solution of corrosive sublimate (1 to 500) and irrigate with a weaker solution (1 to 4,000) during the stitching ; and I have had no reason to complain of the results. To this, however, I must make one marked exception. When applied to the healthy synovial membrane of a joint, the 1 to 500 sublimate lotion produces inconvenient irritation ; and therefore when opening an articulation, as for suturing a transverse fracture of the patella, I abstain from the washing, and as a substitute, have hitherto irrigated during the whole operation with the weak solution (1 to 4,000).

And yet I must confess that I have for a long time doubted whether either the washing or the irrigation is really necessary. These doubts have been raised partly by experiments, some of which I mentioned at the London Congress, which had proved to me that normal blood and serum, and even pus, were by no means favorable soils for the growth of microbes in the form in which they are present in the air; and partly by reflection upon the experience we had when we used the carbolic spray.

As regards the spray, I feel ashamed that I should have ever recommended it for the purpose of destroying the microbes of the air. If we watch the formation of the spray and observe how its narrow initial cone expands as it advances, with fresh portions of air continually drawn into its vortex, we see that many of the microbes in it, having only just come under its influence, cannot possibly have been deprived of their vitality. Yet there was a time when I assumed that such was the case; and trusting the spray implicitly as an atmosphere free from living organisms, omitted various precautions which I had before supposed to be essential. Thus in opening the pleura in empyema for the purpose of evacuating the pus and introducing a drainage tube, and afterwards in changing the dressings, I had previously applied over the opening a piece of cloth steeped in an antiseptic lotion to act as a valve and prevent the entrance of air during inspiration. But under the spray I omitted the valve and allowed the air to pass freely in and out of the pleural cavity, although I used the spray at such a distance from the producing apparatus that it was dry and transparent, with the particles of carbolic solution necessarily widely separated from each other. And these particles cannot have been in more than instantaneous contact with much of the dust before it was drawn within the chest and securely protected by the pus or serum there from any further action of the antiseptic. It is physically impossible that the microbes in such dust can have been in any way whatever affected by their momentary presence in the spray.

Yet we did not find our results in the treatment of empyema rendered worse by this false confidence in the spray. There are few more beautiful things in antiseptic surgery, as contrasted with the results of former practice, than to see the abundant purulent contents of the pleural cavity give place at once to a serous effusion rapidly diminishing from day to day, till, the opening being allowed to close, the pleura, restored to its healthy condition, resumes its normal function of absorbing gases and, as the natural vacuum within it becomes re-established, the atmospheric pressure blows up the contracted lung and brings it again into contact with the chest wall unimpaired in its dimensions. Such a course we had witnessed before the days of the spray and such we continued to see during its use.

If then no harm resulted from the admission day after day of abundant atmospheric organisms to mingle unaltered with the serum in the pleural cavity, it seems to follow logically that the floating particles in the air may be disregarded in our surgical work. And if so, we may dispense with antiseptic washing and irrigation ; provided always that we can trust ourselves and our assistants to avoid the introduction into the wound of septic defilement from other than atmospheric sources.

Since we abandoned the spray, three years ago, we have been careful to compensate for its absence, not only by antiseptic washing and irrigation, but by surrounding the seat of operation with wide spread towels wrung out of an antiseptic solution. For the spray, though useless for the object for which it was originally designed, had its value as a diffuse and perpetual irrigator, maintaining purity of the surgeon's hands and their vicinity as an unconscious care-taker. But if besides the spray we give up all washing and irrigation of the wound, our vigilance must be redoubled. Yet I believe that with assistants duly impressed with the importance of their duties, the task would prove by no means difficult. I have not yet ventured to make the experiment on any large scale, though I have long had it in contemplation. It is a serious thing to experiment upon the lives of our fellow men ! But I believe the time has now arrived when it may be tried. And if it should succeed, then perhaps may be fulfilled my early dream. Judging from the analogy of subcutaneous injuries, I hoped that a wound made under antiseptic precautions might be forthwith closed completely, with the line of union perhaps sealed hermetically with some antiseptic varnish. And bitter was my disappointment at finding that the carbolic acid used as our antiseptic agent induced by its irritation such a copious effusion of bloody serum as to necessitate an opening for its exit. Hence came the drainage of wounds. But if we can discard the application of an antiseptic to the cut surfaces, using sponges wrung out of a liquid that is aseptic but unirritating, such as the 1 to 10,000 solution of corrosive sublimate, we may fairly hope that the original ideal may be more or less nearly attained.

We have already made of late considerable approaches towards it. Our wounds being no longer subjected to the constant irrigation of the spray, and carbolic acid having given place to the less irritating, though more efficient, solutions of corrosive sublimate, serous discharge is much less than formerly and less drainage is required. In many small wounds where we used to find drainage imperative, we omit it altogether, and in those of larger extent we have greatly reduced it. Thus after removing the mamma and clearing out the axilla, I now use one short tube of very moderate calibre where I used to employ four of various dimensions. But it would be a grand thing if we could dispense with drainage altogether; without applying the very firm elastic compression adopted by some surgeons, which, besides involving the risk of sloughing of parts of low vital power, with the chance that it may after all fail in its object, proves often extremely irksome to the patient.

It remains for me to say a few words regarding the best form of external dressing. Some surgeons have thought that simplicity and efficiency may be combined in the maximum degree by the use of cotton wool sterilized by heat. But though it may be a simple thing to heat the wool appropriately by means of suitable apparatus in a public institution, for the ordinary practitioner it would be impracticable. And as regards efficiency I need hardly remark that cotton wool merely aseptic can only exclude septic mischief when it is in the dry state. When it is soaked to its external surface with a copious discharge, it must be liable to become septic *en masse*. And however well we may succeed in the future in diminishing or abolishing discharge from wounds made by the surgeon, there must always remain cases in which it will occur in greater or less amount. Contused wounds, for example, into which dirty material of one kind or another has been introduced before they are seen by the surgeon, must be purified by the use of powerful antiseptic means and must for a while discharge freely. The same is to be said of cases in which we make the attempt, often with signal success, to restore an aseptic condition in a part affected with septic sinuses. Again there are abcesses in which, in the present state of our knowledge, we cannot avoid the occurrence of considerable serous oozing, and in which a perfectly trustworthy antiseptic dressing is a matter of life and death. And wherever discharge is considerable, it is essential that the dressing be of a kind which will not permit the development of septic organisms in it, although it be saturated throughout; and this can, I believe, only be attained by the use of chemical antiseptic substances. I have for some time past employed for this purpose a combination of the two Cyanides of Zinc and Mercury, which appears to fulfill the requisite conditions of antiseptic efficacy and due storage of the agent in spite of free discharge, together with absence of irritating properties. Having already published on this subject, I will not detain the members of the Congress with details regarding it, further than to say that since the date of that publication Professor Dunstan, of the London Pharmaceutical Society, has devised means by which the substance can be prepared in a perfectly definite manner, and containing twice as great a percentage of the Cyanide of Mercury as that which we have hitherto used. And as I have ascertained that the Cyanide of Mercury is the more important ingredient antiseptically, and also that its larger amount in Dunstan's material does not make the salt irritating, we may fairly regard the new preparation as an improvement.

And yet we have had no need to complain of this substance in the form in which we have used it hitherto. Those who have followed my practice at King's College Hospital during the year and a half in which this dressing has been employed, will agree with me that we have secured a constancy of aseptic results which has more than ever justified the performance of operations once quite unwarrantable.

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Tendency to necrosis exists at all times of life, but especially in early youth, when it is most destructive and less amenable to treatment.

# THE MOUND BUILDERS OF NORTH AMERICA.

BY T. L. GAERTNER, LL. B , PITTSBURG, PA.

The question has frequently been asked, and Archaeo-geologists give various theories, whence came this great semi-civilized people who erected the mounds found in the valleys of the Mississippi and its tributaries? Whither did they vanish? What objects did this primitive race have in view when they constructed these mounds and fortifications at a period the antiquity of which cannot be accurately estimated?

Archaeo-geologists as well as other scientists are agreed that some strange semi-civilized race of people erected the mounds found in this country. Many of these remains still stand as left by the original occupants, save only the change and decay which time itself produces, all are looking toward an early development which must sooner or later come showing from whence came this peculiar race, "the Mound Builders."

Some of our scientists believe the Mound Builders were a semi-progressive people and the forefathers of the American Indians who were wild and barbarians. They further believe at one time the United States and all of British America were in a tropical latitude, during the Mound Builders' era, contemporary with which the Mammoth, Mastodon and the wild savage Indians roamed through the primeval forests of British America and United States. These scientists further believe at a later period a gradual cooling-off occurred at the polar points extending toward the equator, thereby changing the Arctic tropic clime to a frigid latitude, compelling the then existing animals to emigrate Southward toward warmer clime, as well also the barbarian Indians, who in turn were forced to come in contact with and entered the Mound Builders' realm; the ultimate outcome of which resulted in the final overthrow and enforced emigration of the Mound Builders into old Mexico and Central America. It seems a new lease of life was then given to the Mound Builders who in turn achieved a wonderful degree of civilization at the arrival of Cortez in Mexico.

This gradual cooling-off hypothesis is not corroborated, and if anything science demonstrates to the contrary, that great cataclysmic wave swept partly if not over the whole of the then tropic zone of North America, the North Atlantic and Europe;

thereby subjecting their desolate waste to the glacial actions. This accounts for the presence of the carcasses of tropical and semi-tropical animals entombed in polar ice, animals with their skins and flesh even intact; the bones of Mastodons, etc , found in the states ; the fossils found firmly embedded in lime-stone, as the petrified remains of snakes, fishes, etc.; the myriad fossils of monsters of the past found huddled together at Fossil Lake, in the midst of that wild, picturesque and inhospital desolation known as Sage-brush Desert in Oregon. All these facts are mute reminders of the earth's wonderful and sudden change which occurred ages ago changing this latitude from a tropic to a frigid clime.

On the other hand there are scores of scientists who lean to the belief that the Mound Builders and the American Indians were two distinct types and in all probability distinct races of people. The Indians were a wild and savage race, who gave their entire time to hunting and war-making against mankind; the Mound Builders were pre-eminently given to agriculture, were not warlike, and established their settlements at or near the fertile valleys of the Mississippi and its tributaries. If these two distinct types or races of American Aborigines came from the same common origin, then their separation must have occurred during the great glacial epoch which followed the cataclysmic waves which swept over and changed the then tropic zone into what are now the frigid and temperate zones. The Mound Builders probably lived during this disturbing epoch to the South of the glacial region, and the American Indians evidently dwelt in the midst of said region. After a separation of several ages it is easy to account for the disparity which existed between the two types of American Aborigines. After the receding of the glacial actions the Mound Builders gradually extended their dominion Northward until they reached points in Michigan and Wisconsin. From discoveries made in late years it is evident that the Mound Builders of this country were closely identified if not related to one of the ancient Mexican races, the Nahuas. A little more light may be obtained, if we in addition to the multitudinous remains of the Mound Builders found in this country, take into consideration the legend that existed among the Delaware Indians when first discovered, we get a scant and of course not perfectly trustworthy account of this ancient race, but it is the earliest information we have and is very plausible. It is noteworthy that this tradition does not claim the Mound Builders to have been the Indians' progenitors, but on the contrary pronounces them a distinct and strange race of people from the Delawares. The tradition of the Delawares, that ages before they had been created, they dwelt upon the shores of the great sea in which the sun sank at night (the Pacific). That many ages before the white men came, they journeyed Eastward in search of a favored land of which their wise men told them, at or near the Father of Waters they had come into contact with the Iroquois, destined to be for ages their chief enemy. The Iroquois like themselves were journeying Eastward. Upon the Eastern side of the Father of Waters they came upon a powerful race, who contested their crossing that stream, but by joining forces with their future enemies, the Delawares overpowered the strange people and then passed through their domain to the Atlantic. The ancient tradition of the Delawares says that their enemy were a great nation and had many forts and temples, and they called themselves Allegewi. So the Delawares gave to the stream which marked the Eastermost boundary of the strange race the name of Allegewi-hanne (hanne meaning stream). Allegewi-hanne becoming by easy linguistic evolution Allegheny, and to-day we have perpetuated the name of this mysterious race and perhaps the oldest of American words. According to Dr. Foster (in his "Pre-historic Races"), and the late Rev. Dr. Short, of the Ohio University, the ancient Nahuas of Mexico were the Mound Builders of the United States. These learned men go one step farther and adduce evidence showing that the ancient Nahuas afterwards became incorporated with the more ancient Mayas, they traditionally dwelt in the land of the Mound Builders ; that the Nahuas' exodus from the Mound Builders' realm occurred about the year A. D. 241, or sixteen and a half century ago. They claim these facts are not arrived at by a wild speculation in the past but by careful studies and computation upon the basis of ancient Mexican data and dates.

A considerable degree of contrast existed between the Mound Builders and the American Indians. Prof. Wm. McAdams, of Alton, Illinois, who has been collecting Mound Builders relics for the World's Fair, lately secured about 50 well preserved skeletons in sepulchral mounds near Alton. The skulls are entirely unlike

Indian skulls, showing much fuller development. A remarkable feature is the hyoid, or tongue bone, which is differently shaped from that of any known human race. The Mound Builders had different customs and habits from the American Indians. Traditionally the history of ancient Rome was repeated on this continent, civilization at one time had to vanish before the approaching hordes of barbarian Indians. It is a very easy matter to tell whether a relic belonged to the Indian or Mound Builders' era; you can readily distinguish a Mound Builder's skull. If we follow the explorers as they pass southwestward, we find a constant increase in the size, and conformation of the crania of the Mound Builders, until we find in Mexico that the race had reached the zenith of its civilization at the arrival of Cortez.

In trying to get a vague idea of the Mound Builders objects and antiquity, we must judge from their remains as found scattered in the territory formerly inhabited by them. It seems as time passed by they gradually extended their surroundings with the increase of their population outward toward the north, northeast and northwest until the crisis was reached when the American Indian overpowered them, which was followed by emigration southwestward toward Mexico. Judging from their remains the Mound Builders had achieved a remarkable degree of civilization before they left their old domain. How many years and lives they sacrificed defending their possessions is impossible to estimate at this date. They must have remained a very long time here, and if we can place any reliance from what we find, the Mound Builders devoted the greater part of their time to agriculture and to the constructions of their temples (mounds), they also erected fortresses which were used for the protection of their people against the predatory warfare of the hostile tribes, or even, it may be, against the incursions made by other Mound Builders.

In regard to the mounds, there has been much speculation, and they are usually divided into sacrificial, sepulchral, temple, symbolical and signal.

The sacrificial mounds exist mainly in Ohio, and it is strange that the sacrificial deposits on such mounds do not disclose a miscellaneous assemblage of relics; from one altar hundreds of sculptured pipes chiefly occur; on another pottery, copper ornaments, stone implements; on others calcined shells, burned bones; on others no deposits have been discovered.

The sepulchral mounds are numbered by the thousands. They evidently served for the mound builders the same purpose as tomb stones do to-day.

The temple mounds are truncated pyramids, with paths or steps leading to the summit, and sometimes with terraces at different heights. Among the most noted of these is Monk's Mound in Madison county, Illinois, near East St. Louis. It is about seven hundred feet long at its base, five hundred feet wide, and ninety feet high. It evidently served a double purpose—temple and sepulchral mound. The Mound Builders buried a great number of their dead at its base. Strange to say, different forms of worship have been extolled from this monster shrine. In addition to the Mound Builders who at one time ages ago performed their religious rites here, a band of monks of the religious order of Trappists, in the latter part of the last century, occupied this mound and lauded God according to their Christian creed. From them the mound derived its name, Monk's Mound.

The symbolical mounds consist of gigantic bas-reliefs formed on the surface of the ground, representing men, animals and inanimate objects.

The signal mounds as well as their fortifications were for protection against an invading enemy.

The antiquity of these mounds is shown by their relation to the primeval forests. The Mound Builders were a settled agricultural people, their enclosures and fields were cleared of trees, and remained so until deserted. When discovered by Europeans these enclosures were covered by gigantic trees, some of them 800 years old.

The stone and bone implements from the mounds, in their shape, differ little from those of Europe. The hatchets and knives are not only made of flint, but also of obsidian and other hard stones. Copper was the chief metallic substance out of which they made various implements. It was obtained from the shores of Lake Superior, where they carried on extensive mining. They also made numerous articles out of pottery.

The most important article of all has been found in Ohio in the form of a cross, very similar to the early Greek cross. Occasionally tablets with hieroglyphics theron are found in these mounds, which some day will be interpreted, thereby opening up a new scientific territory for the archæologist. Whenever said day arrives what is now unwritten history will be unfolded to the thoughtful mind, and the mystery of a mighty Mound Builders' empire or empires rising and crumbling on this continent will be told. It is expected we will then learn what part wampum played in the daily vocation of the Mound Builders.

## ELECTRICITY DID IT.

### A MAN'S HEART PUNCTURED BY A HORSE-HAIR NEEDLE AND ITS ACTIVITY RENEWED—RECENT DISCOVERIES BY MEDICAL MEN.

A man whose appearance suggested that death had seized him was in the hands of a physician of Providence, says a New York journal, who believed that a chance for life remained, and that, if the action of the heart could be quickened, it might be possible to save this patient. Yet every remedy known to medical science had been applied, and without success. The physician was sure that, although the slightest symptom of heart beat could be detected and that organ seemed perfectly still, yet life had not so completely departed as to make renewed action impossible. The physician therefore decided to attempt a desperate remedy. He determined to pierce the man's heart with a needle and then apply an agent, whose power is recognized by the medical profession, but whose use is yet to be well understood.

The surgeon, therefore, selecting a small needle not larger than a hair, very sharp, attached to it a wire connecting with an electric battery. With precision of hand the surgeon thrust this needle into the patient's breast, pressing it until it punctured the heart. The patient was unconscious ; he felt no pain, and, if he had been sensitive, the pang would have given no greater torture than the prick of a needle gives. The electric current was then applied, the surgeon listening with intensest emotion, for he had zeal for his patient and also the enthusiasm of science. For a little while it seemed as though this remedy must fail, but, after a little, the experienced ear of the surgeon detected the faintest of pulsations, and as the current of electricity continued its passage through the heart, that organ, whose fibers were but a continuation of the electric needle, responded, began again and again to beat and send the blood coursing through the arteries, and, after a little, the patient opened his eyes and was alive again. Never has science brought back one so near death's door as this man was, and the joy of the surgeon in saving his patient's life was almost equaled by that delight which the true scientist experiences when he has made a discovery of material value.

This is regarded as perhaps the most important as it is the most sensational of all the cases reported to that infant association which is called the Electro-Therapeutical Society, an association which some of the ablest electrical experts as well as some of the most brilliant men in the medical profession belong to, will, in the course of a few years, develop the use of electricity as a medical agent with the accuracy and scientific precision which the use of drugs entail.

The society has just had its second annual meeting ; 150 men, coming from all parts of the United States, were present. Some of them are medical men of scientific knowledge, who have experimented with electricity with astounding results, and have reduced experiments to something like scientific formula.

Following the remarkable operation by which, after puncturing a man's heart with a needle he was brought to life, there have come remarkable experiences which Dr. Kellogg, of Battle Creek, has met with in the last year. By using a current of peculiar nature and intensity Kellogg discovered that he was able to cause muscular action in the limbs that were seemingly dead. A patient suffering from spinal trouble who was unable to use his legs on that account was subjected to a current of this sort. The muscles in the limbs responded and by continued applications their normal condition was almost restored, so that the legs became healthy and the muscles strong, instead of flabby and deadened from lack of exercise. The same current used on a person suffering from St. Vitus' dance enabled the physician to gain control over the muscles, and, although the experiments have not gone far enough to determine, it seems within the bounds of probability that the time may be not far away when this dread disease may be conquered or at least controlled by electricity scientifically applied. Kellogg made another discovery which may have an important bearing in the treatment of cases of derangement of the stomach. He found that by use of instruments charged with electricity peculiarly generated he could hear distinctly what may be described as the churning process that goes on in the stomach during digestion, and when this experiment was described every medical man knew that with the aid of the ear it may be more easy to diagnose troublesome affections of the stomach than has been the case heretofore. This peculiar electric current may come into general use for the cure of torpidity of the bowels, especially of chronic cases, for Kellogg discovered that as a remedial agent of this kind it was in some cases most effective.

Other developments which have been made the past year were discussed with scientific zeal at this meeting. It was said, for instance, that it had been discovered that some remarkable cure or relief in cases of tumor had been effected by placing the morbid flesh between the poles of a strong magnet. Some interesting experiments were made with a very powerful magnet at Edison's works. It was discovered that a drop of healthy blood was not affected in the slightest by the magnetic current, although a microscope placed over it was so powerfully influenced that it was almost impossible to hold it in position. A drop of water was affected slightly by the magnetic current. It was suggested by some of the electrical experts, among whom were Prof. Houston and Mr. Kennelly, Edison's chief electrician, and Mr. Carty, the chief electrician of the Metropolitan Telephone Company, who were present, that the magnetic current, while having no effect whatever upon healthy tissue, may be potent in its influence upon morbid tissue, such as make up tumors. In this direction experiments will be continued and investigations carried on during the coming year.

Electrician Carty, in a paper which he read to these medical scientists, suggested that in the beginning of this new department of medical science it was absolutely necessary to secure a nomenclature. There is none now. A physician in Michigan might report that he had treated with success a case with Faraday, meaning by that a Faraday battery, and another physician in New York might make some other report of a treatment with Faraday, but that would mean no more than if a physician should say he had prescribed opium. It is necessary for a correct understanding to know how much opium. At present there is no such scientific nomenclature as there is in the use of drugs. A medical prescription is understood all over the world, and the use of electricity as a medical agent will be of slow progress until there is an agreement as to terms. This is to be considered by the association during the coming year. President Morton in a half-jest suggested that the time might be near at hand when a prescription would read: "Recipe—Take volts so many, amperes so many, interruptions so many, and alterations so many," the physician thus prescribing accurately the nature of the electrical current to be administered; and yet what was suggested in this half-playful manner seemed after all to the association to contain possibly the key-note of electro-therapeutics, or electricity as a medical agent.

The association held its first meeting a year ago, and that was not a very successful gathering. The study was then in its infancy—and, for that matter, is now—but there were a few medical men of great ability whose professional character is of the highest, who have such faith in electricity as a medical agent that they believe it is likely to play as important a part in the world of medical energy as it has in the world of traffic, communication and other commercial developments.

## THE PHILOSOPHY OF THE HOMŒOPATHIC LAW OF CURE, AND THE ADVANTAGE TO THE DENTIST OF A CORRECT KNOWLEDGE OF ITS APPLICATION.[1]

BY CHARLES H. TAFT, D.M.D., CAMBRIDGE, MASS.

The subject which I have chosen for my theme is one upon which nothing, to my knowledge, has ever appeared in print in the literature of our profession. In view of the rapid strides which dentistry has made within the last half-century, the character of the men who, with the wisdom born of a combined intelligence and rare inventive turn of mind, have brought the standing of our calling up to the full dignity of a liberal profession, the earnestness and the willingness of our brethern everywhere not only to seek after but to recognize truth wherever found, whatever its nature, it may seem strange that the grand principles of homœopathy should not long ere this have been recognized as furnishing one of the most important and efficient aids for the full and proper performance of all that the public expects of us as dentists. And yet, in view of the fact that in no dental school in the country, so far as I know, with one possible exception, is the materia medica taught on lines other than in harmony with the views of the allopathic or so-called regular school of medicine, it is not to be wondered at that when surgical or mechanical treatment fails to give the relief which the dentist often justly feels should follow the performance of an operation, he is then absolutely "at sea" as to what further course to pursue, unless it be to fall back upon palliatives, counter-irritants, and narcotics for the temporary relief of pain.

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[1] Read before the Massachusetts Dental Society, at its Twenty-seventh Annual Meeting, held at Boston, July 7, 1892.

Before going further let me assure my hearers that nothing is further from my purpose in this paper than to cast any discredit or reflection upon any school of medicine, or upon any one whose views in any way differ from mine. If I appear to be too aggressive, be assured it is merely because of my desire not only to disprove the assertion so often heard made, that medicine is not an exact science and never can be, but to prove that when practised in accordance with well-established laws it cannot possibly be anything else.

There exist to-day throughout the civilized world two prominent schools of medicine; the one, the old, or so-called regular school of medicine; the other, the homœopathic, or new school of medicine. The former rests upon a mass of theories, experiments and facts—all good in themselves, to be sure, but without any effort or attempt being made to detach and put them together in their logical order or relation to each other. Without systematic organization of knowledge there can be no such thing as science, and since our friends of the old school make no claim that their system is founded upon any knowledge other than what is purely empirical, I believe they are honest when they affirm that medicine is not a science, and never can be, and I agree with them fully so far as their method of practicing is concerned. Nor is it to be wondered at that without a well-defined knowlege of the toxical and medicinal action of the various drugs which the physician may make use of, and in the absence of any good and sufficient reason or principle whereby he chooses a drug, or more generally mixes several of them together for the treatment of disease, he might naturally mistrust the foundation upon which he stands in the practice of his profession, as well as his ability to effect a speedy relief from pain or a permanent cure.

How different is the case with him who is guided in his methods and treatment of disease by principles founded upon purely inductive and deductive processes of reasoning, leading up to a well established law of cure as scientific and universal in its application as the laws governing the movements of the heavenly bodies, and indeed all the natural or physical laws which govern the whole universe!

The homœopathist claims that medicine, when practised in accordance with the teachings of Hahnemann, is therefore not only a science, but an exact science, because it rests upon a fundamental law; and we come now, first, to the consideration of this law of cure, and afterwards to the consideration of how it concerns the dentist in his every-day practice.

Briefly stated, this law is expressed by the phrase *Similia similibus curantur*, which means that for the proper treatment or cure of any disease, a medicine must be selected which would produce symptoms similar to those manifested when administered to a person in health.

To test the correctness of this law one has only to prove it upon himself or others to be convinced of its accuracy.

The first question, therefore, which naturally arises when a patient presents himself with any particular disturbance of the vital force is: What medicine will produce a similar group of symptoms when taken in a state of health? When, after carefully making note of all the symptoms, subjective as well as objective, we select a remedy which reaches the totality of all the symptoms—in other words, when we have found the similimum, or similar remedy—we give the medicine with the utmost confidence that it will produce the desired result. There is no guess-work nor any hit-or-miss principle about it, as obtains where the physician is guided by no scientific principle in the selection of his remedies.

We recognize, therefore, that every medicine must have a certain definite action; first, its physiological or toxical effect upon the different organs and tissues of the body; and secondly, its medicinal or curative action. By studying the physiological action of a given drug, we find that it has certain characteristics which distinguish it from other drugs. We find that different drugs affect in peculiar and in different ways the brain, the heart, the lungs, the digestive organs, the bones, the muscles, the mucous membranes—in fact, all the different organs and tissues of the body—each one producing well-defined symptoms in localized parts of the system, and by the process of reflex action affecting thereby the whole system.

Conversely, by studying the nature of the disease, we recognize that there is, as Hahnemann says, a disturbance of the vital force which manifests itself in plainly-marked symptoms. In other words, the organs or tissues, which are for the time being in a condition of abnormal functional activity, find themselves not in harmony with the rest of the system, and to effect a proper restoration to health of the parts concerned, harmony must be restored.

To demonstrate the philosophy of the homœopathic law, therefore, we must show that the only intelligent and scientific method of restoring harmony is by the administering of what is termed the similimum or similar remedy, and this brings us naturally to the consideration and proper understanding of the laws which govern the action of law: the first law being that every drug produces two entirely opposite effects; the first, the primary and transient effect; the second, the secondary and permanent effect.

To make this law clear by illustration: an old-school physician prescribes, for instance, a cathartic for constipation, and what is the result? The patient soon has a violent diarrhœa, the intestines being forced to an unusual and an unnatural activity. In a short time the primary effect passes away and the secondary effect takes its place, leaving the intestines again in a state of torpor and the same or a more aggravated condition than before. The relief has been, to be sure, a temporary one, but the subseqent condition is worse than the first.

Again, morphine is a drug too often employed for the relief of pain and to stimulate sleep. Its primary effect accomplishes this, but what is its after-effects? Increased sensibility and restlessness, which requires in every case an increased dose to again allay. Many other examples might be cited, did time permit.

The second and equally important law is, that precisely opposite effects can be produced by the same drug, according to the quantity in which it is administered. The idea has long prevailed in the old school that if a drug was good for anything it must be administered in a large dose to be productive of any good; but this idea, fortunately for humanity, is fast falling into a state of innocuous desuetude, and the practice of allopathic physicians in this respect is becoming very materially modified. The remark of Dr. Oliver Wendell Holmes in this connection, and his scepticism as to the value or efficacy of medicines when so administered, so far as their thereapeutic value is concerned, is too familiar to us all to call for any repetition here on my part.

(*To be continued.*)

## PHRASEOLOGICAL WORDS.

WE will quote quite frequently some phraseological words in connection with anæsthesia and anæsthetics, in order to have a clear and comprehensive understanding. I will explain in detail each word.

"ANÆSTHE'SIA": Absence of sensation, either local or general. It may be either the result of disease or from use of an anæsthetic.

*A. Dolorosa :* Loss of sensibility to stimuli, with pain due to central causes.

*A. Gustatoria :* Ageusia.

*A. Olfactoria :* Anosmia.

*A. Sexualis* : Absence of sexual desire.

"ANÆSTHESIM'ETER" : Instrument for measuring amount of an anæsthetic used.

"ANÆSTHE'SIS" : (1) Production of anæsthesia; (2) Anæsthesia especially local.

"ANÆSTHET'IC" : (F) Anesthesique ; (G) Anæsthetik ; (I) Anestetico, an agent which destroys sensation. It may be general, acting upon central nervous system, or local, abolishing sensibility of peripheral nerves of a particular area. Also as an adjective ; (G) Anæsthesisch or anæsthetisch, pertaining to or capable of producing anæsthesia.

"ANÆSTHETIZA'TION" : (1) Condition of anæsthesia ; (2) Process of inducing anæsthesia.

"ANÆS'THETIZE" : To induce anæsthesia.

"ANÆSTHETOLE'PRO" : (L) Anæsthetic form of leprosy.

# PERISCOPE.*

BY H. C. WOOD, M. D.

ANÆSTHESIA.—The most brilliant modern achievements in the direct saving of life by the science and art of medicine are connected with surgery. These great achievements have been rendered possible by two epoch-making discoveries, antisepsis and anæsthesia. The long array of fatal cases of poisoning by carbolic acid, by iodoform, by corrosive sublimate, and by other antiseptic agents; the hundreds of deaths from chloroform, ether, and other anæsthetics,—all bear witness to the verity of the law of sacrifice, in obedience to which the progress of the human race is so often at the expense of the individual. Antisepsis has outgrown the dangers of its youth, and to-day the measures that are meant to save, very rarely kill. On the other hand, the death-roll of anæsthesia is daily added to; added to, according to my belief, at a rate that has not changed in forty years. Though this be true, from far-off Australia comes the news that jury and judge have condemned to heavy penalty a chloroformist who had lost his patient; and in England itself a leading medical journal lends support to such a verdict by affirming that "deaths from chloroform are preventable, that with due care they may be avoided," and that, therefore, when they occur, they are the result of ignorance or carelessness. If this be true, five hundred deaths and more—the result of ignorance and carelessness! Five hundred surgeons, including such names as Billroth, Jaeger, Simpson, McLeod, Agnew, Hunter, McGuire, and others of equal rank, guilty of manslaughter! And still death goes on. Surely, under such circumstances, the subject of anæsthesia is worthy of the attention of even this, the most learned medical gathering of the nations that the world can furnish. Antisepsis, the gift of the Old World to humanity: anæsthesia, the gifts of the New World, which made the fruits of antisepsis possible: surely it is fitting that I, standing here to-day as the representative of the newer civilization, should be the chosen mouthpiece for the renewed discussion of this old but pressing theme.

In attempting a fresh study of a well-threshed-out subject, I propose to take advantage of the modern physiological methods, and to endeavor to discover by experiments upon the lower animals how anæsthetics kill, and what drugs or measures are most powerful in putting aside their lethal effects. This brings us face to face with the question, How far is it possible to adapt experiments to the needs of practical medicine, and to reason from the lower animal to the man? A full discussion of this subject would not be opportune, but it does seem necessary for our purposes to devote a few minutes to the pointing out of certain guiding principles.

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*Addrses before International Medical Congress at Berlin.

It ought to be acknowledged as a fundamental axiom, that no amount of experiments can overthrow a clinical fact; although when a contradiction between experimental and bedside observation seems to arise, such contradiction challenges the correctness of the alleged clinical and experimental facts alike, and should lead to a careful re-examination. No amount of failure to purge a dog by elaterium proves that elaterium does not purge man; whilst, on the other hand, the discovery that digitalis increased the blood-pressure in the lower animals very properly led to doubt as to the correctness of the, at the time, general belief that digitalis acts upon man as a cardiac sedative, and finally to the recognition of the falsity of the clinical observation upon which such belief rested.

Whatever difficulties may beset the path of the experimental therapeutist, it is certain that law is throughout the universe supreme; that man, at least in his physical nature, is only an especially developed animal; and if drugs act differently upon different animals, such action must be in obedience to certain laws, to us known or unknown.

Any attempt to fairly discuss these laws would lead us too far afield for the present. One law, however, treads so closely upon the matter at hand this morning, that it requires statement. This law is, that when an apparatus or system is of similar function, and of similar functional activity in different animals, the difference in the action of remedies is very rarely, if ever, in kind, though it may be in degree. Throughout mammalia the heart has one general structure, and one general function; the heart of the dog responds to the touch of digitalis as does the heart of the man. The human brain is so much more highly developed than the brain of the lower mammal that it is, in fact, a new organ or apparatus, and its relation to drugs changes with the change of structure and of function. The scope of this law in regard to anæsthesia is not far to seek. The functions especially compromitted in lethal anæsthesia are respiration and circulation. Surely these functions are similar throughout mammalia, and surely we ought to be able to safely reason concerning them, from the lower animal to the man.

Recently, however, alleged clinical facts have been challenged by high authority, upon the strength of experimental results. Under these circumstances, nothing must be at once abandoned, everything must be re-examined. These re-examinations I have made, and I may be pardoned, perhaps, if I affirm that a complete study of the clinical and experimental evidence brings out, not a discord, but a most beautiful concord,—that concord between experimental and practical medicine which so often fails to appear, simply because we cannot fit together the fragments of truth in our possession.

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The perfect anæsthetic will be a substance which has the power of paralyzing the sensory nerve-trunks without affecting other functions of the body. If such drug exists, it yet awaits the coming of its discoverer. Probably until such a sensory nerve paralyzant is found, chloroform and ether will maintain the complete supremacy which they now have; and in the further discussion of my subject I shall confine my remarks to them. Lack of time limits this discussion to—

(1) The method in which these two drugs kill, both in man and in the lower animals; that is, whether they destroy life through the circulation or the respiration.

(2) The comparative fatality attending the use of these two agents, and the reasons for the difference.

(3) The comparative disadvantages between the two agents, and the best method of securing the desired results.

(4) The treatment of accidents occurring during ether- or chloroform-anæsthesia.

In regard to the method in which anæsthetics kill, my own teaching hitherto has been: (1) that although ether in moderate doses acts as a stimulant to the circulation, yet in overwhelming amount it is capable of depressing the heart, but that such depression of the heart is always less than the depression of the respiration; (2) that chloroform may produce death by paralysis of the respiratory center, or by a simultaneous arrest of respiration and circulation, but that primary paralysis of the heart may occur and is especially prone to do so when the chloroform vapor has been given in concentrated form.

I think that these views are in accord with general professional belief, but it has recently been alleged that they are at variance with experimental evidence, so that a re-examination is necessary. What, then, are the clinical facts?

If any credence is to be attached to the statements of competent witnesses who have recorded human deaths during anæsthesia, it is certain that in some cases, under the influence of chloroform, the pulse and respiration have ceased simultaneously, whilst in other instances the respiration has failed before the pulse; and in still other cases the pulse has ceased its beat before the respiratory movements were arrested.

Usually ether arrests respiration in man before it paralyzes the heart, but the collection of records made by Dr. J. C. Reeve certainly shows that the fatal result may be produced by syncope. Thus, Dr. Ernest H. Jacobs, in a report of a fatal case, asserts positively "the pulse ceased, the breathing continued." It would seem that we must allow that ether in the human subject may cause death in the same methods as does chloroform.

Such, then, are the clinical facts; or in other words, such are the results of observations made upon the human subject. What are the results of observations made upon animals.

The general teaching in regard to chloroform has been recently challenged by Dr. Lauder Brunton, who, as the result of four hundred and fifty experiments made by himself upon the prairie dogs of India, has reached the conclusion, as published in the London *Lancet*, that however concentrated the chloroform may be, it never causes death from sudden stoppage of the heart. In the physiological laboratories of the University of Pennsylvania, for some years, several hundred dogs have been used annually, and a very large proportion of these dogs have been, at the end of an experiment, killed by chloroform. The observations of Dr. Reichert, professor of physiology in the University; Dr. Hobart Hare, domonstrator of therepeutics, and myself, have been concordant in showing that chloroform is a cardiac paralyzant, and often kills dogs by a direct action upon the heart or its contained ganglia. The statements made concerning the Hyderabad Commission, however, led Dr. Hare and myself to a thorough and careful study of the subject. Some of our experiments were made by injecting chloroform into the jugular vein; others by administering it by inhalation in the usual way.

The action of chloroform seems to be not seriously modified by the method of administration. We definitely proved that in the American dog chloroform has a distinct, direct, paralyzing influence on both respiration and circulation; that the respiration may cease before the heart-beat, or the two functions be simultaneously abolished; but that in some cases the heart is arrested before respiration. We have frequently seen the respiration continue as long as one, and in some instances even two minutes after the blood-pressure had fallen to zero and the pulse had completely disappeared from the carotid artery.

I do not desire to express any doubt whatever as to the correctness of the experimental data of Dr. Brunton ; I simply claim that both sets of experiments, although they have yielded different results, have been correctly and properly performed. It may b that the high heat or other climatic conditions surrounding the prairie dog, make his heart less sensitive to the action of chloroform than is the heart of the dog bred in northern climates. That th thought of the different constitutions of animals in different climates is not absurd, is shown by the fact that some years ago—after I had affirmed before the Physiological Section of the International Medical Congress at London, that if certain asserted results were obtained upon European dogs, said dogs must differ from those of America, and had been met with a smile of incredulity—Dr. Brown-Sequard rose and stated that he had experimented with hundreds of dogs on both continents, and that there was a distinct difference between the animals, the vascular system of the European dogs being much more developed, and operations upon them being, therefore, much more bloody than is the case with the American dog.

A very curious parallel might be traced at this point between the experimental and clinical evidence in regard to the effect of climate upon the action of chloroform; in the southern United

States chloroform is used with great freedom, and with great alleged safety; and as long ago as 1878, Dr. Langdon B. Edwards, editor of the *Virginia Medical Monthly*, wrote: "It is one of the most peculiar facts, I have ever known in medical practice, the difference of experience in Europe and the North, with chloroform and ether, as compared with that of the South, the high rate of mortality in the North, and the low rate of the South." Further, in a recent letter to me, Sir Joseph Fayrer is very emphatic as to the safety of chloroform in India.

In a series of experiments which I have recently made myself to determine the changes in the circulation produced when ether-anæsthesia is carried on to death, I have found that in the first periods of anæsthesia the blood-pressure is usually elevated, and that it is usually quite high at a time when the respirations are very shallow and imperfect, and the dark color of the blood shows that it is heavily charged with carbonic acid. It is not, however, very rare for the blood-pressure to remain near the normal, and I have seen the blood-pressure begin to fall in the very first stages of ether-anæsthesia; moreover, in at least two experiments death occurred from syncope, the respiration continuing for one or two minutes after the complete cessation of the circulation. In an experiment in which the fall of blood-pressure was most pronounced, and the arrest of the heart most complete, the dog was sick from the mange, and it is possible that the weakened heart was more susceptible than the normal heart to the depressing influence of ether.

So far, then, as concerns the method in which ether or chloroform kills, I claim most urgently that there is no contradiction between the results as obtained by the bedside and in the physiological laboratories, and that a complete, broad study of the clinical and experimental evidence leads to one conclusion: namely, that chloroform and ether are capable of paralyzing the respiration and the circulation; that in some cases one function, in other cases the other function, is primarily arrested; but that ether is less prone to produce a primary arrest of the heart than is chloroform.

In the discussion of the second point which I have raised, namely, as to the comparative fatality attending the use of ether and chloroform, I shall not occupy time with any elaborate setting forth of the clinical evidence. In regard to the number of recorded deaths I shall content myself with accepting the latest statistics at hand, namely, those collected by Dr. Lawrence Turnbull, who has found three hundred and seventy-five deaths reported from chloroform, and fifty-two from ether. I do not believe that these figures nearly represent the total mortality. I doubt very much whether one-third of the deaths from anæsthesia are reported; certainly not one-third of the cases I have had personal knowledge of have been publicly recorded. Moreover, the pressure to conceal deaths from chloroform is greater than when the lethal result is due to ether. The surgeon who uses ether feels he has employed the safest anæsthetic, and that he will receive no blame if a death occurs from it, and feels also that he has a rare case to put on record, which will give his own name a place in anæsthetic literature; whereas, the surgeon who uses chloroform knows that if a death occurs from the anæsthetic, a large proportion of the profession, at least in the United States, will condemn him either in public or secret for the use of this drug, and that he will be fortunate if he escapes being publicly condemned by a coroner's jury. Moreover, deaths from chloroform are only too common, so that the surgeon has nothing to gain and much to lose by publication of a chloroform death, and if possessed of the average human nature, holds his peace.

It seems to me impossible to get at the exact number of deaths, or the proportionate fatality of ether and chloroform. Lyman considers that in regard to chloroform the ratio of deaths to inhalations is 1 in 5860; Richardson, that it is 1 in 2500 to 3000. Andrews puts it, for ether, at 1 in 23,204, and Lyman at 1 in 16,542.

Without claiming strict accuracy for any of these figures, I think that it can be asserted that the probable ratio of deaths from chloroform is four to five times that of deaths from ether.

When we come to study the effects of chloroform upon the lower animals, we find that it varies very distinctly in its action on the different species. The cat seems to withstand the fatal influences of chloroform with a power worthy of its reputed "nine lives." Many years ago, Professor Schiff called attention to the fact that the use of chloroform as an anæsthetic in dogs is usually attended with the loss of many animals. Professor Martin, of the

Johns Hopkins University, writes me that the margin between complete chloroform-anæsthesia in the dog and chloroform death is a very narrow one. This certainly is our experience in the University of Pennsylvania; we have never been able to use chloroform as an anæsthetic without losing a very large proportion of our dogs.

Clinical and experimental results—*i. e.*, the results of experiments made in the physiological laboratory upon the lower animal, and the results of experiments made in the amphitheater upon the higher animal, man—are again concordant. Chloroform is much more inimical than ether to animal life. The cause of this singular fatality is not, however, chiefly the cardiac action of chloroform. Chloroform is more apt to cause cardiac arrest than is ether, but it is also much more prone than is ether to cause death by the failure of the respiration. Almost invariably when ether is withdrawn before the dog is absolutely in the grasp of death, recovery occurs; but over and over again I have noticed that although the chloroform was taken away whilst the respirations were still being maintained with regularity, the arterial pressure much above zero, and the pulse very apparent, yet the symptoms of cardiac and respiratory failure continued to increase until the fatal issue was reached.

It seems to me that certain general facts or principles in regard to anæsthesia must be considered as established:

(1) That the use of any anæsthetic is attended with an appreciable risk, and that no care will prevent an occasional loss of life.

(2) That chloroform acts much more promptly and much more powerfully than ether, both upon the respiratory centers and the heart.

(3) That the action of chloroform is much more persistent and permanent than that of ether.

(4) That chloroform is capable of causing death either by primarily arresting the respiration, or by primarily stopping the heart, but that commonly both respiration and cardiac functions are abolished at or about the same time.

(5) That ether usually acts much more powerfully upon the respiration than upon the circulation, but that occasionally, and especially when the heart is feeble, ether is capable of acting as a cardiac paralyzant, and may produce death by cardiac arrest at a time when the respirations are fully maintained.

(6) Chloroform kills, as near as can be made out, proportionately four or five times as frequently as does ether; partly, no doubt, because it is more powerful in depressing the heart, but largely because it lets go its hold much less rapidly than does ether when inhalation ceases. Is it not possible that this "holding on" is because it is less volatile than ether, and can we not here get a hint why chloroform is less deadly in the South than in the North? The diffusibility of vapors or gases is in inverse proportion to the square of their densities, and the vapor of chloroform would certainly diffuse itself with far greater rapidity at 90° F. than at 70° F.

The comparative advantages and disadvantages of the two anæsthetics in practical medicine are so well known, that only one or two points seem to force themselves upon our present attention. I cannot see that the surgeon is justified in putting the life of the patient to the unneccessary risks of chloroformization, except under special circumstances. I believe, moreover, that much of the unpopularity of ether is due to its improper administration. It is so easy to embarass the respiration seriously by the folded towel, as commonly used, that not only are the struggles of mechanical asphyxia almost invariably produced, but probably death itself sometimes caused. Especially is there danger of death being thus caused mechanically in the advanced stages of etherization, when the patient is too thoroughly etherized to struggle, and when the attention of the etherizer is, it may be, attracted to some novel and difficult operation. I confess myself to once having nearly killed a patient in this way.

A proper apparatus is certainly preferable to the folded towel. Various have been invented, but as the time is short I shall only mention one,—one which seems to me a practically perfect mechanism, although it is probably little known this side of the Atlantic.

The inhaler invented by Dr. O. H. Allis is based upon the theory that the patient to be etherized should be supplied with a full abundance of air, saturated with the vapor of ether. It consists essentially of a series of foldings of muslin on a wire framework, arranged almost like the gills of a fish, so as to allow the air to pass freely through, but everywhere come in contact with ether. It should be placed upon the face of the patient dry, and the ether gradually poured on from a bottle with a tight cork through which run two small bent glass tubes—one inside the bottle, long, for the exit of the ether, the other short, for the admission of air. When properly used, the Allis inhaler practically does away with the sense of suffocation, and the consequent struggles which have made etherization so repulsive to patient and surgeon alike.

In order to determine the rapidity with which etherization can be produced by this inhaler, Dr. M. H. Williams kept for me notes of thirteen consecutive cases in the clinic of the Jefferson Medical College Hospital, in Philadelphia. The average time required for the production of complete unconsciousness was eight minutes. The average time during which anæsthesia was fully maintained was thirty-two minutes, and the average amount of ether used durthis time was seven and one-half ounces. In twenty-one surgical cases occurring this spring in the clinical service of Prof. J. William White, of the University of Pennsylvania, the average time for the production of complete anæsthesia with ether, used through Allis's inhaler, was seven and nine-tenths minutes. The results arrived at in these two clinics are so close that eight minutes must be considered as the average time required for full etherization by this apparatus.

In discussing the treatment of the accidents of anæsthesia, the results obtained at the bedside naturally press forward for careful consideration, but in going over the subject from this point of view I have found so little that was novel, and so little that was satisfactory to myself, that I shall not occupy the time of this Congress with any conclusion drawn from reported cases, or personal experience in chloroform accidents. I do not think myself that the problem can be solved by any such study of cases. Death is so near and so terrible, time is so absolute, moments so important, that no surgeon would be willing or justified in waiting for the effect of any one remedy; and when a man is dosed with alcohol, nitrite of amyl, hypodermic injections of ether, digitalis, atropine, and other powerful agents; faradized, slapped, douched, stood on his head, subjected to chest-movements for artificial respiration, and various other measures to numerous to mention, who can tell, if by chance he recover, why he has done so? or who can point out, if by chance he dies, what is the remedy whose omission or commission has led to the fatal result?

The problem is a very complex one, not to be worked out admidst the excitement and responsibilities of the amphitheater. Only in the physiological laboratory can its various elements be separated and studied each by itself, without regard to the individual life which is at stake.

In the physiological laboratory two distinct paths open, each promising to lead to some positive knowledge. We may, on one hand, enter upon the study of the minimum fatal dose of the anæsthetic, and of the results produced by the consentaneous or subsequent administration of its supposed physiological antagonist, or we may investigate the effect of remedies upon functions that are failing under the influence of the anæsthetic.

The objections to the first of these methods have been, in the present instance, overwhelming. The accidents seem to be independent of the amount of anæsthetic inhaled, and such a method of investigation would have required far more time than was available after I had had the honor of being asked to address this body. Death is produced by chloroform and ether through paralysis of the respiration and the heart, and the method of experimental study which I have employed consisted in a study of the action of medical agents upon these functions when oppressed by chloroform. I have selected chloroform chiefly because it is the more powerful agent of the two anæsthetics, and the more certain in its lethal results.

The experiments have all been made upon dogs, by one plan. The carotid artery, and also the trachea, having been connected with a recording drum, so that the movements of the circulation and the respiration could be consecutively recorded, the animal was anæsthetized, and when the blood-pressure had fallen almost to zero, and the respiration had ceased, or nearly ceased, as the case might be, a solution of the remedy to be tried was injected into the jugular vein, through a canula which had been previously inserted.

The more important remedies which have been used by clinicians for the averting of threatened death during anæsthesia are ether, alcohol, ammonia, nitrite of amyl, digitalis, atropine, and caffeine, alterations of position, and artificial respiration.

Although, at least in America, hypodermic injections of ether have been frequently employed even in ether-accidents, such use is so absolutely absurd that it does not seem to me to require any experimental evidence of its futility. Ether in the blood acts as ether, whether it finds entrance through the lungs, through the rectum, or through the cellular tissue ; and the man who would inject ether hypodermically to a patient who is dying from ether should, to be logical, also saturate a sponge with the ether and crowd it upon his unfortunate victim.

Instead of simply stating the results obtained in my experiments, I have thought it would be more interesting to show reproductions from some of my tracings. The first drug that I shall report upon is caffeine. I have injected it during the cardiac failure produced by chloroform, in doses varying from three to seven and one-half grains, and have never been able to perceive any distinct alteration in the arterial pressure, and no consistent distinct change of the pulse either in number or force. So far as the experiments go, they certainly indicate that the drug has no influence upon the heart that is being overpowered by chloroform. I may also state here that it is not possible in any of my tracings to make out any influence exerted by caffeine upon the respiration.

With atropine I have made a few experiments, the results being almost as negative as with caffeine. Ten c.c. of a two per cent. solution of atropine injected into the jugular vein of a chloroformed animal altered the rate of the pulse-beat, but had no apparent effect or influence upon the arterial pressure, or upon the respiration, and in no wise prevented final cardiac arrest.

Of all drugs, that which I think is usually most relied upon by clinicians as a cardiac stimulant in anæsthesia, as in other cases of heart-failure, is alcohol. The chemical and physiological relations of alcohol to ether and chloroform are, however, so close, that many years ago I became very doubtful of the value of this drug as a stimulant to a heart depressed by one of these anæsthetics.

These doubts continually grew stronger from what I saw and read as to the effects of the administration of alcohol during anæsthesia, and were finally changed into conviction by the experiments of R. Dubois (*Progres Med.*, 1883, xi, 951), who found that in the animal to which alcohol had been freely given, much less chloroform is required than in the normal animal, to anæsthetize or kill ; or in other words, that alcohol intensifies the influence of chloroform and lessens the fatal dose.

In my own experiments with alcohol, an 80 per cent. fluid was used, largely diluted with water. The amount injected into the jugular vein varied in the different experiments from five to twenty c.c.; and in no case have I been able to detect any increase in the size of the pulse, or in the arterial pressure, produced by alcohol, when the heart was failing during advanced chloroform-anæsthesia. On the other hand, on several occasions, the larger amounts of alcohol apparently greatly increased the rapidity of the fall of the arterial pressure, and aided materially in extinguishing the pulse.

The effects of ammonia upon the failing heart of chloroform-anæsthesia, have been in my experiments uncertain; sometimes distinct, although very fugacious, and sometimes imperceptible. Twenty cubic centimeters of a 10 per cent. solution of aqua ammonia fortior (U. S. Pharmacopœia) in some cases produced an immediate rise in the arterial pressure, and even fugaciously registered itself in the respiratory rate, but perhaps more frequently it failed in its influence.

The influence of injections of digitalis has been, in a number of experiments, very pronounced in producing a persistent gradual rise of the arterial pressure with an increase in the size of the individual pulse-rate. In several instances death was apparently averted by its injection, and I saw in one or two cases, where large amounts of the digitalis had been employed, sudden systolic cardiac arrest, indicating that digitalis, if in sufficient amount, is able to victoriously assert itself in opposition to chloroform. Moreover, when I have given chloroform to dogs whose hearts were already under the influence of digitalis, there has seemed to be a peculiar steadying or sustaining power combating the circulatory depression naturally produced by the anæsthetic, and I believe that in all cases of weak heart in man a full dose of digitalis before the administration of chloroform would greatly lessen the danger of cardiac collapse.

With the nitrite of amyl four experiments were made. In some of these from four to ten drops of the nitrite of amyl were injected in the jugular vein, in others the nitrite was used by inhalation. No distinct effect upon the arterial pressure was in any instance produced, and usually no alteration in the size of the pulse-waves, although sometimes the pulse did appear to be a little fuller.

Of all my experimental results, those which have been reached with strychnine have been the most surprising. The injection of strychnine into the jugular vein sometimes produced a gradual rise of the arterial pressure, but always caused an extraordinary and rapid increase in the rate and extent of the respiration. Thus I have seen the respiration, which had ceased for ten seconds, suddenly, under the influence of an injection of two-tenths of a grain of strychnine, become at once very large and full, and reach a rate of 130 a minute.

A series of elaborate experiments made upon the effect of the position of the animal on the blood-pressure in the carotid and other arteries, has very clearly proven that the body of the animal whose circulation has been paralyzed by chloroform acts in a measure like a tube filled with *fluid*. Thus, if the feet of the dog were raised vertically above the head whilst the latter remained upon the table, an immediate rise of pressure occurred, even though the heart had ceased beating entirely, provided that the head of the animal was kept upon a level with the table. If, however, the head of the animal were depressed below the level of the table for a distance equal to or greater than the length of the body of the animal, a decrease of the arterial pressure occurred at once, although the animal was in a vertical position. The phenomena observed were precisely such as would have been produced if the canula had been inserted into a tube filled with fluid, instead of into the carotid artery, and the elevation and depression of this tube had registered itself on the recording drum, in obedience to the ordinary laws of hydrostatics. The phenomena were entirely independent of any beat of the heart, and were readily produced when the animal was dead, provided the death had not occurred too long previously. Sometimes, even in a very few minutes after the cessation of the heart-beat, it was impossible to produce the changes of pressure upon the drum. This I believe to have been due to coagulation of the blood, occurring very early after death to a sufficient extent to interfere with the liquid properties of the fluid. In no case was any effect upon the respiration produced by the change of position. In a number of cases, however, when the feet were elevated, the heart, which had entirely ceased beating, recommenced its work, and I have several times seen a pulse entirely disappear when the animal was taken from the vertical to horizontal position. On the other hand, very frequently it was impossible to affect the cardiac action by changing the position of the animal. Nevertheless, the phenomena spoken of occurred too frequently to be a mere outcome of chance, though I several times noted that the heart was usually more affected by alternately elevating and depressing the feet of the animal than by keeping it in a steadily elevated or horizontal position.

When the circulation has practically ceased, under the depressing influence of an anæsthetic, inverting the body must cause the blood which has naturally collected in the excessively relaxed vessels of the abdomen to flow into the right side of the heart and distend it, and this distention—this increase of pressure—appears at times to have a sufficient momentary influence to stimulate the failing organ.

The theory which has been advocated by some therapeutists that inversion of the body is of value in the accidents of anæsthesia, because it causes the vital centers of the brain to be supplied with blood, is probably incorrect. The respiration in anæsthesia fails, not through want of blood in the respiratory centers, but because the blood contains a poison which paralyzes these centers.

The most remarkable results which I have reached in bringing about recovery of animals to all ordinary intents and purposes dead, were obtained through the use of artificial respiration. Thus, I have seen an animal, in which no respiratory movements whatever had taken place for two minutes, and in which, during that time, no movements of blood had occurred in the carotid artery, and in which, therefore, the heart had ceased its beat, rapidly and permanently restored by artificial respiration.

At one time in these researches, it appeared as though after any dose of chloroform by inhalation the animal could be resuscitated by artificial respiration, even though heart and lungs were completely paralyzed by the drug; but finally I did find a case in which, after the animal had repeatedly been apparently killed and resuscitated, artificial respiration failed.

The results of my experiments with the lower animals may be summed up: that nitrite of amyl, caffeine and atropine are of little or no use in chloroform poisoning; that alcohol, when given in small amounts, has no influence, but that when given largely, materially assists in paralyzing the heart and producing fatal results ; that ammonia has some little influence upon the heart ; but that of all substances tried, digitalis is by far the most powerful in stimulating the failing circulation ; indeed, my experimental results indicate that it is the only known drug which is of any real practical value in such cases. Next, or perhaps even before digitalis, strychnine seems to be of value in the accidents of anæsthesia, because, whilst having some influence on the circulation, it affects powerfully the respiration. For many years chloroform has been used in practical medicine as the physiological and practical antagonist to strychnine, and it seems rather odd that strychnine should not have been employed as the practical antagonist to chloroform.

The one measure which in practical value far surpassed all others for the restoration of the dying animal was artificial respiration, and I have no doubt that a great majority of the deaths which have occurred in man from anæsthesia might have been avoided by the use of an active artificial respiration. The difficulty with artificial respiration as it has been hitherto practiced upon man, after the Sylvester or other methods, is its inefficiency; whereas the artificial respiration which I used on animals was very active—indeed, much more efficient than natural breathing in causing circulation of air through the lungs, and therefore in removing excess of the anæsthetic from the residual air in the lungs and from the blood.

The use of what may be called "forced" artificial respiration by the physiologist so naturally suggested a similar practice in man, that the celebrated John Hunter invented for the purpose an apparatus which consisted of a bellows so constructed that when it was extended one compartment drew in air from the lungs, whilst the other drew air from the atmosphere; and when it was closed the process was reversed, the fresh air being thrown into the lungs, the foul air into the atmosphere. In 1867, Richardson, of London, invented an apparatus more elegant and portable, although identical in principle with that of John Hunter; but I have not found that either Hunter or Richardson treated by forced artificial respiration an actual case of disease or poisoning. In 1875 (*Boston Medical Journal.*, vol. xxi), Dr. John Ellis Blake reported a successful case of aconite-poisoning, in which life was apparently saved, although there was no pulse for over three hours, by artificial respiration with the use of oxygen. In this case Marshall Hall's method was at first used, but later a small rubber tube was connected directly with a copper reservoir of condensed oxygen, the other end of the tube terminating in a small nozzle, which was inserted in one nostril. Four hundred gallons of oxygen were thus used, but how far the force of the compressed gas was employed to dilate the lungs is not very clear; and it is somewhat doubtful whether this case should be considered as one of forced respiration. The first physician to use forced respiration in actual human poisoning, with a clear idea of its value and power, so far as my reading goes, was Dr. George E. Fell (International Medical Congress, Washington, 1877).

It is plain that the bellows constructed by John Hunter and by Richardson are unnecessarily complex and faulty in principle. There is no need whatever of drawing the air out of the fully-filled lungs. Every physiologist knows that when the muscular system is completely paralyzed by woorari, or even by death, that the chest-walls have sufficient elasticity to force air out of the lungs, and all ordinary laboratory apparatus for artificial respiration is based upon this fact. For forced artificial respiration in man, an ordinary bellows of proper size is all that is required for the motive power.

The real difficulty—the point to be especially investigated and studied—is as to the connection between the bellows and the lungs. Hunter and Richardson simply placed a tube in one nostril, closing firmly the other nostril and the mouth of the subject.

Dr. Fell at first used a tracheal tube, the insertion of which of course necessitated the performance of tracheotomy. In one case, however, a simple mask covering the mouth and nostrils was a perfect success. I have had no opportunity of trying the apparatus on the living, but have made a series of experiments upon dead bodies, which have demonstrated that usually a face-mask is all that is necessary for the performance of artificial respiration. Before using the mask the tongue should be well drawn forward, and, if necessary, fixed in this position by an ordinary piece of suture silk run through it, which can be held in the hand of the operator. If in any individual case the mask fails, an intubation tube may be introduced into the larynx. I do not believe that it is ever necessary to perform a tracheotomy.

Dr. Fell's apparatus consists of a pair of foot-bellows by which air is forced into a receiving-chamber, which is connected with an apparatus for warming the air, and a valve which can be opened and shut by a movement of the finger. This valve in turn leads to the tracheal tube. When the valve is opened the air rushes through the chamber into the lungs and expands them; the finger is lifted, the valve shuts, the lungs contract, and so the respiration goes on. I have no doubt that this apparatus is efficient in practice, but it is open to the serious objection of being unnecessarily complex and costly.

A much simpler, cheaper, and probably equally efficient apparatus may consist simply of a pair of bellows of proper size, a few feet of India-rubber tubing, a face-mask, and two sizes of intubation tubes; there should also be set in the tubing a double metal tube, with openings so placed that their size can be regulated by turning the outer tube (similar to that commonly found in the tracheal canula of the physiological laboratory), so that it is in the power of the operator to allow for the escape of any excess of air thrown by the bellows. I suppose this whole apparatus could be prepared at a very small cost, and it seems hardly necessary to point out its probable value in various narcotic poisonings, and in other accidents in which death is produced by a temporary paralysis of the respiratory centers. The proper use of it could be taught to persons without special medical skill, so that it not only ought to form a part of the surgeon's outfit, but might be of great service in life-saving stations, about gas-works, etc.

In conclusion, I may be allowed to state that if the results and deductions arrived at in this address are, as I believe, correct, the rules for the proper treatment of accidents during anæsthesia can be summed up in a very few words:

Avoid the use of all drugs, except strychnine, digitalis, and ammonia.

Give the tincture of digitalis hypodermically.

Draw out the tongue and raise up the angle of the jaw, and see that the respiration is not mechanically impeded.

Invert the patient briefly and temporarily.

Use forced artificial respiration promptly, and in protracted cases employ external warmth and stimulation of the surface by the dry electric brush, etc.; and remember that some at least, and perhaps many of the deaths which have been set down as due to chloroform and ether, have been produced by the alcohol which as been given for the relief of the patient.

[*See criticisms on page 48.*]

# THE DENTAL AND SURGICAL MICROCOSM.

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Associate Editor, - - - - - - - - - FREDERICK GAERTNER

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## EDITORIAL.

### Review of Address on Anæsthesia by W. C. Wood, M. D.

The much-quoted address on anæsthesia of Dr Wood, as found on page 30 of this number, has passed so long current as authoritative that it may seem quite presumptious to even question the correctness of some of the Doctor's views and statements. Yet, as it is a part of the mission of The Dental and Surgical Microcosm to explore the so-called authoritative statements and theories of the art and science of anæsthesia or hypnotism, we make bold to question the soundness of some of the statements contained in this noted address before the International Medical Congress at Berlin.

In so doing, we shall only endeavor to bring to the light of truth those errors that lay at the foundation and superstructure of the science, and like the terrible fatal maelstrom, is hazarding the very life of the art and science of anæsthesia.

In this review of this address, we must bear in mind that Doctor Wood, in this paper, is endeavoring to show "by experiments" upon the lower animals, "how *anæsthesia kills*," and what drugs, or measures, are most powerful in putting aside their lethal effects.

In so doing, the Doctor states that "the functions especially compromitted in lethal anæsthesia are respiration and circulation," evidently referring to the circulation of the blood by the latter term. Herein the Doctor, like many others, fails to recognize and set forth in due order, causes and results, and as a consequence, in his endeavor to move forward, places the cart in front of the horse and in point of fact loses sight of the horse altogether. Respiration and circulation of blood are as dependent upon neural circulation as is the movement of the cart dependent upon the force exerted by the horse. The *force* that moves the heart and the lungs in the performance of their functions, and upon which arterial and venous circulation depends, is *primarily* much more compromitted in lethal anæsthesia than is respiration and circulation of the blood, as these certainly stand in the relation of cause and effect. Therefore, is it not of paramount importance in our investigations, that we first determine in our own minds, and establish in the minds of others whom we are attempting to teach, the true source of the force that moves these vital organs? Whence cometh this force, how developed and how maintained? And also how may it be interrupted.

We heartily endorse his following sentence: "Surely these formations are similar throughout mamalia; surely we ought to be able to safely reason concerning them from the lower animal to man."

But we cannot agree with the Doctor in this: "The perfect anæsthetic will be a substance which has the power of paralyzing the sensory nerve-trunks without affecting other functions of the body." Just what the Doctor means by the term "paralyzing the sensory nerve-trunks without affecting other functions of the body," we are at a loss to know, and we doubt whether he himself clearly comprehends the true import of the expression. When we speak of the paralyzation of a limb, or any organ, what do we mean? Do we not mean to say that there is not enough force therein to move the organ? But whither shall we look for the force, and how can and *must* that force be made manifest? Not an organ in any animal can perform its functions without the development and conveyance of sufficient force to enable the organ to discharge its functions. Who will question this fact?

Again, it is conceded by scientists that all force is a unit, yet possessing different forms of manifestation, or corretations convertible into each other—heat into light and light into heat; force of gravity into electric force; electric force into *neural force*, etc.

Then we must not lose sight of another uncontrovertible fact—that material force *alone*, and *nothing else*, can move matter. That even spirit, or mind force cannot move or adjust matter independent of material force. Then if this be true, and *undeniable*, how else than by operating upon and through material force can the mind, or spirit of any animal or man make itself known to, or be felt by this material world?

Therefore, the origin, the development, and mode of manifestation of this material force that enables any and every organ of any animal, or man to perform its functions, and how this force may be prevented, perverted or affected in any way, is undoubtedly of primary importance in our researches into the art and science of anæsthesia or hypnotism, and a knowledge of which is essential in the preservation of life in trying to produce anæsthesia as is a knowledge of the force developed by the combustion in the use of dynamite if we would not destroy human life in the various uses to which that powerful explosive may so successfully be employed in adjusting material bodies to the various wants of man. Hence, of all questions on earth, this *one* is paramount to all others: whence cometh this *force*, and how is it made manifest? It will not answer to say that life is this force, and that we cannot know what life is. Life is not force; neither is force life. But *force* may make *life* manifest. That *free-oxygen* is the force of life, or that out of which vital force is generated both by the pneumogastric glands of the lungs, and by the cerebral glands of the brain, is most manifest. That *free oxygen* is the supporter of combustion and sustainer of life, both animal and vegetable, is a well known and conceded fact. That when it is chemically combined with any other chemical element it loses its properties and effects is also a well known fact to chemists. Therefore, any chemical combination that may be formed with any other chemical element, such as nitrous oxide ($N^2$ O.), or N. O., can neither support combustion nor sustain life, either vegetable or animal.

But when the oxygen is *free*, as found in the atmosphere which we breathe, then the combustible force of the oxygen can be readily converted into animo-electric force, or nervo-vital force, by the functions of these glands. That this animo-electricity, or nervo-vital fluid makes manifest the force that moves any and all organs in their functions, and conveys all impressions to the mind or spirit by a proper circulation in the nervous system, no one who properly thinks and recognizes causes and results dare question. That the great heart of the nervous system is the brain, which may be recognized as a galvanic battery generating animo-electricity, thus developing the force that is made manifest in its passage in and through the vaso-motor nerves in the muscles of the various organs to propel them in their functions, must be conceded from the well known results produced.

If it be true that there is never a *result* without a *cause*, then it must be equally true that there is never an exertion or function of any organ without the development and conveyance of sufficient force to exert or perform that function. That this force can only be developed and conveyed by the passage of an electric current or current of nervo-vital fluid outward through the motor nerves must be evident to any unbiased mind who takes cognizance of revealed facts. Therefore, we are necessitated to recognize the fact that there is, the circulation of a substance, in a circulating system within every animal, and upon which arterial and venous circulation depends. This circulating system is the nervous system unquestionably, and as the blood is sent out from the heart through the arteries and returns through the veins, so this nervo-vital fluid, or animal electricity is sent out through the motor nerves and returns through the sensory nerves. The motor nerves communicate from the nerve center to the periphery, and the sensory nerves from the periphery to the nerve center, or brain. These nerves are the electric wires conveying the electricity to develop the force to move the various organs. In point of fact, every animal may be recognized as a created electro motor, generating, developing and conveying by and through the nerves sufficient electricity, when in normal condition, to move the corporate being, and convey impressions to the mind, or spirit.

Therefore, any interruption in the normal currents of the electricity in the nerves—either motor or sensory nerves—will interfere with or prevent the functions of the organs. Not an organ can render its functions except sufficient electricity pass out in the motor nerves to make manifest sufficient force to enable the organ to perform its functions. And not an impression can be conveyed to the mind except a sufficient electric current pass in the nerves of sensation from the periphery to the nerve center. These currents of electricity can only be interrupted in two ways. First, by impoverishing the battery or brain. This can be accomplished by either taking the blood away, or by taking the oxygen out of the blood, which latter can be best and most speedily brought about by administering any inert gas, such as nitrous oxide gas, or carbonic acid gas. Second, by producing what is commonly called a shock—concussion and revulsion—and in no other way can any vital organ be prevented in the exercise of its functions. Then we must bear in mind that there are only two agencies by which this shock can be produced; that the one is internal—the mind; the other is external—chemical or mechanical. The anæsthestic, or so-called anæsthetic is an external chemical agent. The mind or spirit is the internal agent. Now, bearing in mind that there can be no possible way by which the nerve center can be paralyzed only as by either impoverishing the brain as before mentioned, or by producing concussion and revulsion in nural circulation, or shock. Moreover, that this shock or concussion can only be produced by either the action of mind or by the action of an external agent, or by both conjointly, and in no other possible way. If Dr. Wood or any other scientist can demonstrate that these results can be brought about in any other way, or establish as a fact that the nerve center can be paralyzed in any other way, and consequently that a death can be produced in any other way than what I have herein pointed out, I shall be very pleased to know it, and shall be most happy to acknowledge my ignorance.

If these premises be correct, then it follows (since paralysis of nerve centre always precedes the death) that if there be a death while administering an anæsthetic or supposed anæsthetic, it must be caused either by the action of the agent, or anæsthetic administered, or by the surgical operation (which would be mechanical), or by the *action* of the mind. Can there be any other possible way by which a death can be caused? If not, then let us first establish the cause or causes of death by the agent or anæsthetic administered. But in order to clearly understand how death may result and be caused by the agent administered, we should recognize precisely what physical conditions may be brought about, and must necessarily precede the death.

Anæsthesia is a physical condition in which the force and functions of life are in continuance under modifications, whereby an absence of senation is induced. Asphyxia is a physical condition in which the force and functions of life are suspended or abrogated, whereby an absence of sensation is brought about. It is a physical condition in which the blood is deoxidized, and the patient or animal is in point of fact in the first stage of death, as the English savant, Dr. Richardson, says. And when the asphyxia is very profound, and death results from the asphyxia, then the lungs always cease performing their functions before the heart does, no matter whether the agent administered be nitrous oxide gas, chloroform, ether, or any other agent or drug. But if death results by what is commonly called a shock, caused by the agent administered, it must be by the chemical action and effects by the *sudden induction* of an over-percentage of the potent drug, used as the subordinate element in the anæsthetic. True this shock or concussion and revulsion might be produced by the sudden action of the mind, and death follow as a consequence, but this will never occur if the mind be in an acquiescent condition and calm, as it should be. But if death results from administration of the drug, or so-called anæsthetic, it cannot be otherwise than by the sudden introduction of an over-percentage or proportion of the drug in the anæsthetic suddenly thrust into the lungs upon the tens of thousands of nerve filaments, spread out over a surface, as in an ordinary sized man's lungs of about 1400 square feet.

The chemical action of this powerful drug—by reflex—is conveyed to the nerve center with the speed of an electric current, and paralysis of nerve center and death may be the result, no matter what th e drug may be. But when this occurs, the agent administered is not a *true anæsthetic*. It is simply to that patient a paralyzing agent. And when paralysis of nerve center and death occurs in this way, the heart always ceases to perform its functions before the lungs cease to perform their functions, and no matter what the nature of the drug may be that is used as the subordinate elements in the anæsthetic. Therefore the extensive experimental work of the Hyderabad Commission on dogs and cats, etc., and that of many others in the same direction, to ascertain which would cease performing their functions first, respectively in the administration of chloroform, ether and the A. C. E. mixture, has been a work of superorogation and a waste of time and money, in as much as they have not duly considered the relation of cause and effect, not first defined in their own minds the precise physical condition that would be necessary to have—that of asphyxia—when the lungs would cease first, and that precise physical condition—paralysis of nerve center by shock of chemical agent or by action of the mind—that would occasion the cessation of the heart's action.

Hence, I submit, whether the labored efforts of our learned friend in this remarkable paper, has not gone far astray of the object aimed at?

Dr. Wood's paragraph on nitrous oxide gas, has been omitted here, as it has previously been reviewed and the fallacies exposed by our journal. But it must be particularly noted that in all the experiments and clinical facts referred to by Dr. Wood, and by the Hyderabad Commission, there is nothing that will conflict with the truths herein set forth, but on the contrary they only verify and more thoroughly establish their fundamental laws relative to their physical conditions and causes of conditions, and bring much to light that has been considered unknown and mysterious.

With this understanding and knowledge of the laws governing the physical and spiritual man, it is not difficult to comprehend why it is that in the great majority of deaths from the use of aerated ether, the lungs have ceased performing their functions first, and also why, in the great majority of deaths from the use of aerated chloroform the heart has ceased its functions first. As sulphuric ether is much more volatile than chloroform, the atmosphere will take up and carry a greater percentage of ether than it will of chloroform at the same temperature. Therefore, its presence in greater percentage will displace more of the free oxygen in the atmosphere than would chloroform at the same temperature when the atmosphere is charged to its full capacity at a given temperature. This must be admitted by every scientist. And as asphyxia is a physical condition in which the blood is deoxidized or robbed of the necessary quantity of free oxygen to sustain life, we must necessarily have asphyxia when the temperature is high and the atmosphere is charged with ether to its fullest capacity, and if asphyxia, then the lungs will cease their functions before the heart will cease its functioes. Yet in some extremely delicately, nervously constituted patients, there is a possibility of producing a shock from the chemical effects of ether, though a much less powerful drug in its chemical and pathological effects than is chloroform. And chloroform being a more potent drug in its chemical action than is ether, it will so much more readily paralyze the nerve center, and consequently the heart, than would ether at the same temperature, when the air is charged to its full capacity, which undoubtedly accounts for the very many deaths from aerated chloroform, especially in the first stage of administration.

Yet it is true that many deaths occur while anæsthetizing from syncope, both with use of aerated chloroform and with aerated ether. And rest assured that syncope with partial narcosis is a very *unsavory condition*. But then syncope can be prevented by controlling the mind of the patient. Yet it is no more liable to occur with chloroform than with ether; nor with ether than with chloroform. Syncope is caused by the mind operating upon neural circulation, and never in any other way.

Dr. Wood states that: "In the physiological laboratories of the University of Pennsylvania, for some years, several hundred dogs have been used annually, and a very large proportion of these dogs have been, at the end of an experiment, killed by chloroform. The observations of Dr. Reichert, professor of physiology in the University; Dr. Hobart Hare, demonstrator of therapeutics, and myself, have been concordant in showing that chloroform is a cardiac paralyzant and often does kill dogs by a direct action upon the heart, or its contained ganglia."

But if chloroform is a direct cardiac paralyzant, and kills by its direct action upon the heart, then how can it paralyze except by producing concussion and revulsion, by the chemical action of the chloroform, by reflex action from the pneumo-gastric nerves of the lungs, with the use of both drugs, and that is no doubt due to fright of the patient caused by the effects of the anæsthetic and the neglect of the administrator to describe the peuliar effects and sensations in the periphery, the usual pricking sensation and numbness in the fingers, hands, feet, etc., and the strange chilly, sensation creeping all over the patient. The patient is liable to conclude that these remarkably queer sensations are but the chills and sensations of death, and consequently, as they may not be ready to leave this good world, become very badly frightened and if of a syncopic tendency, are likely to faint. And syncope, with partial narcosis, is certainly a very dangerous condition and need never be had if the administrator does his duty in describing these effects of the anæsthetic, just before administering; and if he finds still that the patient is scared, which can always be known from the quick and forcible movements of the pulse, which he readily recognizes with his fingers on the temporal artery, and will then and there assure the patient that the strange sensation that he or she is now experiencing, are but the effects of the anæsthetic. The perfect control of the mind of the patient will always prevent syncope.

Another very *flagrant* error is committed by Dr. Wood, when he says "The action of the chloroform seems to be not seriously modified by the method of administration." This statement is equivalent to saying that "it does not matter whether you have a sufficient quantity of air to sustain life or not. If you administer chloroform, death may or may not be the result.

We are not at all surprised at the many deaths that do occur when chloroform is used under such teachings. The only thing that should surprise us, is that there are no more deaths from the use of such powerful drugs when administered as they so frequently are.

This statement of Dr. Wood is very much like that of a certain dean of a medical college in Ohio, who informed me several years since, that when he administered chloroform he always endeavored to exclude the air, and that he had administered it to over 8,000 patients. Rest assured I was not surprised at the result when I learned from another authenticated source of the many deaths that occurred under his administration.

If the force of life is free oxygen, or if free oxygen is that out of which vital force is generated, and if it is the only element that will support combustion and sustain life, then surely "the action of the chloroform will be *modified* by the method of the administration." One method may exclude *nearly* all the air, while another method may give a sufficient quantity of atmosphere to sustain life. One method may develop and administer an asphyxiating or a paralyzing agent, another method may generate and administer a true anæsthetic.

Is there no difference between an asphyxiating agent or a paralyzing agent and an anæsthetic? A true anæsthetic must have in it enough *free oxygen* to sustain life. That free oxygen is obtained, and can only be obtained, from the air which we breathe. Hence, chloroform, ether, etc., are not anæsthetics,no matter how much they may be so called. They may be the subordinate element in the anæsthetic. The *free* oxygen is the *all important* element in the anæsthetic, and, without which, there *positively* can be no anæsthetic. Therefore, chloroform, as it contains in itself no oxygen, can only be either an asphyxiating or paralyzing agent. And we challenge any man to prove the opposite. Aerated chloroform or ærated ether, etc., or "pure narcotized air," may be a true anæsthetic. But it must be borne in mind that either may also be an asphyxiating or a paralyzing agent, and that they may produce only asphyxia or paralysis of the nerve centre, when the atmosphere contains too much of the drug, so that by the presence of an over-percentage of the drug in the atmosphere, the proper quantity of free oxygen necessary to sustain life, is excluded. These premises are unquestionably correct. And no man of science and judgment will hazard his reputation to question these fundamental principles.

[TO BE CONTINUED IN NEXT NUMBER.]

PERSONS contemplating a stay in Chicago of a few days during the World's Fair, will do well to remember the new hotel, The Hanchet, just opened by Mrs. Case and Reinhart—everything new, neat and clean—at 529–531 Fiftieth Street. Rates 50 cents to $2.50; rooms with or without board. This hotel is within a short distance of the World's Fair grounds, and will cater to the special wants of dentists, physicians, school teachers, etc. You will find it very comfortable at reasonable rates, and convenient to the cable cars for up or down town.

THE work is progressing finely on all departments of the World's Fair grounds. Most of the states have agents of their respective Boards of the World's Fair Managers at Chicago already to assist in receiving and installing the exhibits from their respective states. Pennsylvania's Board has on the grounds in the Pennsylvania State building as their agent, Mr. Walter C. Lowry, whose services will be given the exhibitors from this state without charge, except the cost of labor and material when it may be necessary to use them.

## IN MEMORIAM.

### JOHN A. HOUSER, D. D. S.

The demise of this worthy citizen of Charleston, West Virginia, so seemingly untimely, sudden and without any warning of the approach of the pale messenger, on the morning of October 21st, in Chicago, Ill., hundreds of miles away from home and friends, is but another instance of the dreadful uncertainty of human life.

Doctor Houser left his pleasant home and family, and his dental office and lucrative practice in the hands of his assistants, on the morning of the 19th of October to join the President of the Hayes Dental and Surgical Manufacturing Co., and five other dentists and physicians in the employ of this company, in a trip from Chicago through the Western states and territories to the Pacific Coast. The Doctor having telegraphed the President of the company at Pittsburg, Pa., that he would meet him in their place of business at 1204 Wabash avenue, Chicago, on the morning of the 20th he accordingly called early in the morning and left his card stating at what hotel he was stopping, aud remarked that he would call again. Then on the morning of the 21st, and the day of the dedication of the Columbian World's Fair, it seems that he started to go to the office of this company, and when he got within a half square of the office he was seen clinging to some boards put up in front of a building that was just being built, and presently he was seen reeling and falling. He was immediately picked up and was seen to gasp for breath but once. For some time, evidently, there had been an abnormal condition of his nervous system, probably due to his close confinement to his office and over-work in his practice that manifested itself in interruptions of the functions of the heart on several occasions. This condition of the Doctor's nervous system under the probable patriotic excitement of the occasion, and in the mingled crowd of all nationalities, with various bands of music and national flags floating in the air, the strain upon this delicate nervous system was in all probability too much, and the force that propels the organs of life suddenly gave way, and the spirit left its *clay tenement* for a *brighter* home.

Doctor John A. Houser was born in Bedford, Pa., and at the time of his death was in the fifty-second year of his age. His father was of German descent. He graduated from the dental college in Philadelphia, and settled as a dental surgeon in Holidaysburg, Pa., practicing his profession until his removal to Charleston in 1871. He married the widowed daughter of the late James C. McFarland. He leaves two children, who together with their mother survive him.

Dr. Houser was a worthy, good citizen, and his known public spirit in all that pertains to the progress, welfare and prosperity of his adopted city called him to a seat in the city council, where he served one year. In the course of his practice as a skillful dentist, he had several pupils, two of whom are now pursuing the practice of dentistry in Charleston, and others at other places. His integrity and honesty are well known, and the large number of patients under his skillful treatment in their respective cases will greatly miss his services. He was generous and liberal in dispensing and in the distribution of his alms to charities, kind and indulgent in his family, and hospitable in his house and home. Doctor Houser was one of the most popular in his profession in his adopted state, and honored by all who knew him.

Col. R. S. Carr, one of the Commissioners of the World's Fair, and a personal friend of the Doctor, and Dr. S. J. Hayes, of Pittsburg, selected a neat metallic casket and had his remains properly prepared and placed in the casket; when Col. Carr and his good wife accompanied his remains to his friends in Charleston and to their last resting place. After the funeral services of the Episcopal Church, attended by a large number of sorrowing relatives and friends, together with a body of the Knights of Honor, of which he was a member, the body was interred at Spring Hill Cemetery.

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DR. VAN VALZAH died at his residence in Terre Haute, Ind., on Sunday, Oct. 23d, 1892, the immediate cause of death being Bright's disease and dropsy.

He was born at Lewisburg, Penna., in 1842, and was the son of William Van Valzah. When not yet of age he began the study of dentistry under Dr. R. E. Burlan, with whom he remained two years. He then went to Philadelphia and engaged with Dr. J. D. White, Emeritus Professor of dentistry, in the Pennsylvania College. In 1863 he entered the Union army, enlisting in Company

A, 28th Pennsylvania Volunteer Infantry. In the spring of 1864 he became a resident of Terre Haute, where he has since resided, engaged in the practice of his profession, which he began shortly after his arrival. In 1868 he was elected a member of the city council, which office he held one term. In 1871 he became an officer in the Grand Lodge of A. F. and A. M. of the State of Indiana, and in 1878 was made Grand Master of that body, retiring in May, 1879. In 1878 he was elected a member of the Board of Trustees of the city shools for three years, he being President of the Board. In the same year he was also elected a member of the State Legislature. In June, 1879, when the Indiana State Dental College of Indianapolis was organized, he was appointed Clinical Instructor. He was also First Vice-President of the Indiana State Dental Association.

Until he was overtaken by illness, he was engaged in the practice of dentistry, his office being in the Opera House. He was a cousin of Dr. Robert W. Van Valzah, dentist at Fifth and Main streets. Dr. Van Valzah leaves two children, Robert Van Valzah, Jr,, and Miss Catharine Van Valzah,

The funeral services, held on Tuesday, Oct. 25th, were conducted by the officers of the Masonic Grand Lodge of the State, of which he was Past Master.

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The Dental and Surgical Microcosm in the future as in the past, will ever *hew to the line*, regardless of friends or foes. A higher standard of education in all that pertains to her mission will be her one leading thought. Belonging to no school of physicians or class of dentists, but seeking the good for all, and earnestly contending for truth and right, she will endeavor to brush aside the cobwebs of error, arrogance and prejudice, and diffuse the genial rays of light, truth and knowledge. Especially will The Dental and Surgical Microcosm exert herself in this respect in her mission in the art and science of anæsthesia, or hypnotism. No stone of error will be permitted to remain long in her pathway without being turned over by her deep and sharp plowing, if it be within the realm of her province. All of like mind are invited to contribute to her columns; to assist in making this journal, of all journals, the most aggressive and earnestly progressive of the age.

## DEATH FROM SYNCOPE WITH PARTIAL NARCROSIS.

Otto Martin Fowler, the 8-year-old son of Dr. R. S. Martin, pastor of Grace Methodist Episcopal Church, LaSalle avenue and Locust street, Chicago, Ill., died in October, 1892, while yet in the operating chair, from the effects of syncope with partial narcrosis.

Dr. Paul, oculist and aurist, at No. 343 North Clark street, said: "I had been treating the child for earache. On discovering the growth back of the nose, of which the earache was but a result, I advised the parents to call in a specialist on nose and throat troubles. I suggested Dr. Dunn. He was called in and performed the operation of removing the growth from the back of the ear. I was not there when it was done. The child's general health was not good."

Dr. W. A. Dunn, who is professor of nose and throat diseases in Hahnemann Medical College, and conducts a private hospital of his own for the treatment of throat, nose and ear maladies, said:

"I perform that kind of operations every day, and while not more than one in ten thousand results fatally, it has unfortunately fallen to my lot to be the one in this case. Every precaution was taken. In all operations of that sort, I will allow no one but my assistant, who is an expert, to administer the chloroform. I knew the child's general health was not good. None suffering from mouth disease have good general health. There was positively no way of ascertaining that there would be any danger in using chloroform. But a small amount was given. To the moment I turned him over to empty the blood from his mouth, I felt sure the operation was a success. Then he turned pale, and all efforts to revive him were futile. I have never had a similar case die under my hands before. The immediate cause of death may have resulted from weakness in the heart or in the brain, or from any one of several weak portions of his system, which could not be named accurately without a post mortem examination. It was one of these cases where the general system had become so run down as to be unable to stand the operation, though so far as could be learned by an examination, the probabilities were that the operation could be made with perfect safety."

From personal interview with Mr. Dunn, I learn that there was no evidence of asphyxia, such as purpleness or deathly palor. There was nothing to indicate any danger to life until after the operation was over, when all of a sudden the child grew pale and the heart ceased to perform its functions. No doubt through fright from the effects of the anæsthetic and a weakened constitution, the boy fainted.

Had the operator controlled and directed the mind of the patient ingeniously, immediately as consciousness was being restored, this fatality might not have occurred. Perhaps, if after the child fainted, they had immediately applied the electric current from a Faradaric battery properly, the child might be still living. But usually the battery is not on hand, as it always should be in such delicate operations.

We are thoroughly satisfied that the death was not caused by the administration of the ærated chloroform, nor from the chloroform *per se*.—[EDITOR.]

## ANOTHER DEATH FROM NITROUS OXIDE GAS.

Prof. James N. Harris, D. D. S. of the University of Maryland, writes us in regard to a death from nitrous oxide gas, as follows: "Walter Penrose, of Philadelphia, took gas to have a tooth extracted, October, 1891, and died before the tooth was taken out and on the dentist's chair. He was between 40 and 50 years of age, had always enjoyed good health, and was supposed to be in perfect health at the time. The friends of Mr. Penrose promised to get for me the name of the dentist in Philadelphia, also that of the physician, but from some cause failed to do so. Had I gotten the names of the physician and dentist, I intended to write them for such facts as they felt disposed to give."

In a letter later, Dr. Harris says: "I neglected to say that he consulted two physicians about the advisability of taking the gas. One advised him that he could take it with safety. The other advised him not to take it, that it would be very unsafe."

It no doubt may seem strange to many that not only this death from nitrous oxide, nor the one in Elmira, N. Y., nor the death that occurred in Dr. Yates' office, at 802 Penn avenue, Pittsburg, Pa., on December 30th, 1891, nor the recent deaths that occurred in New York, all from the use of nitrous oxide gas, have never found their way into the numerous dental journals. But it may not seem so wonderfully strange after all, when you come to think that all these journals are published by dental dealers, save one, and that all dental dealers deal in gas apparatuses and the gas, and some, by virtue of their numerous patents on gas apparatuses, and making and selling gas, have made thousands of dollars out of the gas. Then, it must also be borne in mind that this one journal, not directly connected with any dealer, yet is dependent for its money on the advertising columns which must be filled by ads. from these dealers.

Will they publish what will kill their business? Who will answer?

Why have these numerous deaths and cases of insanity not been published in these dental journals?

Can any one guess why?

## ANOTHER DEATH FROM MAL-ADMINISTRATION OF CHLOROFORM.

While the doctors at the county hospital in Chicago, November 8th, were resetting George Norman's broken leg, he expired from the effects of chloroform administered by them. He commenced to sink as soon as the anæsthetic was administered, and all efforts at resuscitation proved futile. Dr. E. J. Farnum gave a certificate indicating chloroform narcosis as the cause of death, but the Health Department refused to issue a burial permit and turned the case over to the Coroner. Norman was a laborer, 30 years of age, and lived at No. 154 Albany avenue, where an inquest was held the next morning.

In justice to the friends, and for public safety and protection to life, when such deaths occur, experts in the art and science of anæsthesia, should be called in to ascertain the precise cause, if possible, of the death. A true anæsthetic *never kills*. It is the how you make and how you administer, that the pleasant and unpleasant results follow.

AMOY, in China, bears the doubtful distinction of being the most dirty and unhealthy city in the world.

## WE ACKNOWLEDGE THE RECEIPT OF

*The Microscope*, an illustrated monthly magazine for the student of nature's little things, edited by Charles W. Smiley, A. M., and published by the Microscopical Publishing Company, Washington, D. C.

AUTHENTIC WORLD'S FAIR JOURNAL.—The World's Fair Dedicatory and Christmas issues, are fine specimens of art and literature. Every lover of art and progress should subscribe for the journal, especially if they would become conversant with the World's Fair exhibits of modern wonders.

"The Rise, Fall and Revival of Dental Prosthesis," edited by Prof. B. J. Cigrand, B. S. D. D. S. The book contains upwards of 150 pages, and is embellished with three finely executed plates, containing some thirty engravings—illustrating specimens of ancient, mediæval and modern dental art. Dr. Cigrand has studiously labored in the compilation of the work, and it will be a worthy companion to other dental volumes.

"The Annual Report of the Postmaster General, Hon. John Wanamaker." The report is one of the most complete and satisfactory ever issued by the department, and shows greater progress in the work of the Post Office Department in establishing mail routes, free mail deliveries in the smaller cities and country towns, and in securing revenue to the department, than has ever appeared in any previous report. In fact, this report convinces even the enemies of Mr. Wanamaker that there is a master workman at the helm, and we trust that his suggestions to Congress will be adopted.

THE PITTSBURG TIMES.—When *The Pittsburg Times* took possession of its splendid building last April, its publishers promised that *The Times* would grow in excellence in the same proportion as its quarters have been enlarged *The Times* has already won such a proud position among the newspapers of the country, that there was general curiosity to know how the promise would be redeemed. That curiosity has been most pleasantly gratified. *The Times* has been so enlarged, and so many new features have been added, that it is everywhere cited as a marvel of modern journalism. The chief wonder is, that a newspaper so complete in every respect, can be delivered to subscribers for one cent a day—little more than the cost of a first-class weekly paper. A postal card order will secure the delivery of *The Times* on trial to any address.

PAMPHLET published by The Wilmington Dental Manufacturing Co. Edited by Edward H. Angle, D.D.S., on "Correcting Irregularities of the Teeth." It is quite instructive.

*The Dental Tribune*, a newspaper for dentists. Edited by Dr. Louis Ottofy, of Chicago. Just out with a bright countenance.

*Pennsylvania and the World's Columbian Exposition*, containing rules, regulations and classifications, with an introductory chapter on the resources of the Commonwealth. Compiled and published under direction of A. B. Farquhar, Executive Commissioner.

WE would call the attention of our readers to the change of the date of volume of THE DENTAL AND SURGICAL MICROCOSM to conform with calendar year. We in consequence of this change which, as will be seen commences with this number, have arranged title page and indexes of Volume I and Volume II—first and second numbers, to be bound in one volume. Therefore, Volume III with this number is the initial for another book.

We have in reserve copies of Number 1, Volume III, for new subscribers and advise all who would have the full volume to send in their subscriptions at once, that they may receive the first number of the volume. Many have applied for Numbers 1 and 2 of Volume I, but we regret we could not supply them, as they were rapidly taken. We find that especially the articles on the art and science of anæsthesia, have been highly appreciated, and have created a large demand both in the dental and medical professions.

As the new year is welcomed by all around, and the joyous jingle of the bells, and thrilling whistle of the engines, the dull rumblings of the cannon, the war guns and martial bands announce the joyous event, we pen our congratulations to our many readers wishing them a happy and prosperous new year, good health and lots of wealth.

## ANOTHER DEATH FROM NITROUS OXIDE GAS.

Dr. G. N. Preston, dentist, of Elmira, N. Y., administered nitrous oxide gas to Mrs. Philip Sebert, a comely married woman, who took his dental chair to have a tooth removed shortly before 5 p. m. After administering the gas and producing the asphyxia, he removed the tooth, when she uttered a faint scream, gasped and fell back in the chair dead. The autopsy proved her heart to be in a normal condition. Asphyxia is the first stage of death, as Dr. Richardson truthfully says, and may lead to complete death. When the blood is robbed of the tree oxygen, so that there is not enough to sustain life, then the patient sinks, and all the powers of earth can't save the patient.

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It is conceded by both the medical and dental professions that there is no other science connected with the healing art that is so little understood, and at the same time so important, as the art and science of anæsthesia. Then why not have special training schools in which to teach as a specialty this important art and science? If life and health depends upon the knowledge and skill of the the anæsthetizers, as is admitted by all both in the dental and medical ranks, why not require of every one who undertakes this work, a certificate of thorough quelification from a competent board of examiners before he be allowed to anæsthetize.

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We trust that the readers of The Dental and Surgical Microcosm may not mistake, her for a stranger in consequence of her new dress. Whether she will be appreciated more in her orange than in her blue garment remains to be seen.

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In our April issue we shall open up a column of "wants" for the benefit of those desiring to advertise their office furniture, etc., for sale, or for those either in the medical or dental profession who may be seeking locations or employment, and our charges for the same will be five cents per line.

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It may be of some importance to those contemplating advertising their merchandise to the dental and medical profession to know that the subscription list of The Dental and Surgical Microcosm has been increasing so rapidly that we shall issue five thousand copies in our next, or April issue. We doubt whether any other journal ever made a like record of increase.

## PULP PROTECTION BY CAVITY LINING.

In teeth where there is the slightest chance for the pulp to become injured by thermal influences, the safe course is best. Too much care cannot be given to the protection of the pulp. We must always bear in mind the larger proportional size of the pulp in early life, the possibility of its occupying an abnormal position, the chances of there being a crack or fissure extending to it, and of a point of it coming nearly to the surface.

The difference between sensitive dentine and tenderness of the pulp, must also be diagnosed. Sensitive dentine responds when excavating over a considerable portion of the cavity walls, does not respond to simple pressure; while, when in near proximity to the pulp, it responds quite as readily to pressure as to the cutting instrument, and is confined so completely to a single point, that the danger is at once soggested to the operator.

In deep-seated cavities, the necessity of caution becomes greater, and the danger of intruding on pulp territory increases, and, unless carefully protected, thermal changes may prove a disturbing influence, which will give rise to more serious trouble.

For the protection of the pulp against these iufluences, something should be used with as little conductibility as the case will admit. Scores of different materials have been in use; among them, varnish and the various zinc plastics, oxyphosphate, oxysulphate and oxychloride; with me, varnish is the most useful. I use the sandarac gum, dissolved in alcohol and quite thin. The effect of varnish lining is to leave on the cavity walls a thin, semi-opaque, whitish film, which is non-conducting, non-irrating, insoluble and more in harmony with dentine than any metallic substance, and can be used in any cavity, however shallow, because of the small amount of space it occupies. The operation of varnishtng is very simple; having the rubber-dam adjusted and the cavity properly dried, a small pellet of cotton is dipped in the varnish, which is thus conveyed to the cavity touching the bottom and walls. Five or ten minutes should be allowed for hardening, which can be hastened by hot air.

In proximal cavites of the posterior teeth, especially those extending below the gum margin, we sometimea find ourselves in close proximity to the pulp, with barely depth enough for anchorage to the filling. We find nothing else will take the place of varnish in these for a lining. Varnish will prevent filling material showing through thin enamal walls, which might be unsightly without it.

Oxyphosphate is an excellent liner; it is adhesive, does not shrink, and is indicated where the walls of the tooth need strengthening. I deep-seated cavitiei, where undercuts exist, if the enamel is strong, it need not be cut away, for when hard cement is carefully packed in its place, it forms a support when hard, almost equivalent to dentine. A cavity cut in to it to a depth a little greater, than enamel, reduces the final filling with gold to an operation of the simplest character, as this cavity has a hard, firm base of cement and a boundary of cement and tooth substance, or of the latter alone. When usir.g an oxyphosphate in deep-seated cavities, we must not forget the the necessity of protecting the pulp agarnst the effect of phosphoric acid. This can be done by varnishing the bottom, or by using a little oxysulphate, or a pad of the zinc and oil of cloves.—*G. F. Cheney*, *Ohio Journal.*

## POST-GRADUATE TEACHING.

Systematic courses of instruction are still being carried on for medical men, who are thus enabled to keep themselves posted in all the most recent views and methods of the physicians and surgeons of the front rank. A somewhat analogous arrangement was made at the dental hospitals for practitioners a few years ago, and seemed to be appreciated. Sir James Paget, in an address last week, alluded to the erroneous impression that a license or diploma is a thing which not only conferred a legal right, but a sort of moral right to practice. Sir James held that it did nothing more than declare that the person who received it was fit to practice on the day on which it was conferred, and that it would depend on the holder himself whether he would be fit ten years later. The only way is to remain constantly a student, and, though the circumstances are not precisely parallel, it would seem that dental practitioners may apply the above remarks to themselves, and, in default of post-graduate classes, should lose no opportunities of attending demonstrations and other professional meetings which may be open to them, that they may observe the application of even well-known facts by others.—*Items of Interest.*

## LOCAL ANÆSTHESIA IN OPERATIONS.

A new process for this purpose is recommended by Wiesendanger, dentist at Hamburg, and experiments have been performed with it in the surgical clinics of Berlin, as well as in the Hamburg Infirmary, where Chief Physician Doctor Scheede applied it very successfully. This process is principally founded on the following very simple consideration: It is well known that science has succeeded recently in compressing gaseous bodies, such as carbonic acid, oxygen, oxide of nitrogen, hydrogen, air, etc., into liquid condition, and their expansion, as demonstrated by Pictet's experiments, produces enormous degrees of cold, never known before. Wiesendanger has availed himself of liquid carbonic acid, which may be purchased at any time in large iron bottles. But his special invention is the "psychroter," an instrument destined to concentrate in a metallic chamber the cold produced by the carbonic acid when liberated, and thereby to increase or reduce it, according to desire. This piece is placed on the spot of the body where an operative wound is made. It is obvious that as a beginning the apparatus will be limited to smaller operations, while, on the other hand, it is easy to impart to the piece various forms as indicated by the case. The action of the cold on the skin makes itself felt immediately; a slight burning is noticed, just as from a glowing metal, and, on removing the apparatus, a white spot, as from burning, is seen, which is entirely insensible. The application, nevertheless, leaves no traces behind, and very soon the skin recuperates its original color. The cold induces the immediate absorption of all blood heat and causes anæmia of the hypodermic cellular tissue, when the insensible spot may be subjected to operations without any further preparation. The psychroter is constructed so as to allow to direct the outstreaming gas into the wound, causing anæsthesia of the interior sensitive nerve. At the same time, so the inventor supposes, the strong air current has also an antiseptic action, thereby presenting an advantage over complicated wet preparations. At the same time the wound, he says, is cleansed and bleedings are arrested. The advantage of the proceeding, if it should prove efficient in all respects, would consist in avoiding the highly injurious chloroform—narcosis in all minor operations, sutures, cutaneous incisions, opening of abscesses, wart, dental, corn and nail operations becoming absolutely painless. Its greatest advantage is to be found in its manageableness. Every physician can have at his command bottled cold during his consultation hours. The inventor especially applied his process in dental practice, where it was highly successful. In this case the shape of the piece to be applied is adapted to the shape of the gums. Liquid carbonic acid in iron bottles, under a pressure of fifty or sixty atmospheres, is sold at one to two dollars. Bottles of the latter kind suffice for fifty or sixty operations.

## SYSTEMATIC READING.

In this age of progress, we believe that every intelligent, progressive and ambitious dentist is a constant subscriber to one or more journals. Some take a number, and during the month make the effort, at odd times, to assimilate and digest their contents. Others read their journal through as though it were a novel, and then place it upon the shelf to be bound at the end of the year, and add another volume to their, to them, useless library. Others read with system, and with an object in view. hence, gain education, not simply information—two decidedly different results. A man's library is valuable to him in just such a degree as he has command over it; and, while it is impossible for him to be the possessor of its entire contents, it is possible and easy for him to have this amount of knowedge so under his control as to be able to lay his hands, in a few moments, upon the literature of any given subject. As one point in the different suggestions that might be made to attain this end, we would suggest the following: Go to a wholesale stationer, buy a plainly-ruled 250-page day-book; have it indexed throughout, thus forming a large index, with an average of about ten pages to each letter of the alphabet. Every month, as your journals are read, note such information as is important, worthy of remembrance, and liable to be of future use to you. Classify these articles under certain heads that will be suggestive and lead to their being readily found when wanted, and enter them alphabetically in your index. You will be astonished how soon these pages will fill up, and how useful and labor-saving they will prove to you.

As a sample of the utility of such an arrangement, we will suppose that one has received a notice of the monthly meeting of his society, and that D.—— is going to read a paper upon "Diseases of the Maxillary Sinus." In order to appreciate and be entertained upon such a subject, to say nothing of placing yourself in a position to discuss the subject intelligently, it is necesary that you are conversant with what has already been written. In a short time, by turning to your index, you note, under the heading "*Antrum*," the literature of the subject. Try it for awhile; there will be no fears about your continuing the habit.—*The Dental World.*

## STOP SPITTING.

The modern gospel of prophylaxis teaches that phthisis can be abolished from the face of the earth if only people would stop spitting. Says Dr. T. M. Prudden:

"If the vile and increasing practice of well-nigh indiscriminate spitting goes on unchecked in nearly all assembling places and public conveyances; if the misquided women who trail their skirts through the unspeakable and infectious filth of the street,are to be admitted uncleansed into houses and churches and theatres; if theatres and court rooms and school houses and cars are to remain the filthy lurking places of contagion which their ill ventilation and their mostly ignorant and careless so-called cleaning necessarily entail; if in sleeping cars and hotel bedrooms the well are to follow consumptives in their occupancy without warning, or even the poor show of official disinfection; if in ill-ventilated and ill-cared for dwellings, the well must breathe again and again the dust borne seeds of tuberculosis; if no persistent warning is to be given to the ignorant of the dangers which work in uncleanliness—then our task will be most complex as well as difficult in limiting the contagiousness of tuberculosis."

Of course cleanliness and plenty of water are necessary; but, after all, it is the expectoration which carries the germ and promotes the spread of disease. Spitting, it seems, is not only a vile, but an increasing habit. This is an unfortunate social fact which reformers do not seem to have grasped, despite its noxiousness. Shall we not have to have a Society for Prevention of Expectoration—except into sanitary spit-cups? If one could stop the spitting habit, prevent the spread of consumption and finally stamp it out, he would be greater than a tariff reformer.—*N. Y. Medical Record.*

## TREATING AN EXPOSED, OR PARTLY EXPOSED, PULP.

First saturate the cavity with ''heaven's'' cordial, and a little of the following mixed with it: one part oil cloves, three parts carbolic acid made into a soft paste with tannin. If you have not heaven's cordial, use in its place chloroform. Then clean away all debris from the cavity, as well as you can, without disturbing the pulp. Be careful not even to lift the thin, leathery layers of softened dentine from over or near it; for the less the pulp is disturbed the surer the treatment. Now, cut down weak walls, and be as thorough in preparing the cavity for fflling as possible, without impinging on the pulp. Rub a little of the obtundent in the cavity (but not enough to saturate), and over the flow a coating of chloropercha. Blow on warm air to evaporate the chloroform, and then fill the capity with oxyphosphate, put in rather thin, so as to avoid all pressure, and also so that it will stick to the walls of the cavity.

In from four to six weeks the pulp will be incased in a beautiful tanned covering. This should not be disturbed. The best way is to have everything intact, except ro remove a little of the oxyphosphate, so as to give room and undercut for a permanent covering of alloy of gold.

Before this, however, and during the healing of the pulp, there may be an accumulation of pus. If so, remove the temporary filling, thoroughly syringe with hot water, and after flowing over a little peroxide of hydrogen, then repeat the first dressing, though of course a favorable result is not so sure.—*Items of Interest.*

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We cannot separate ourselves from our work. Our patients will make their estimates of us and couple us with our work. To be well in repute, we must not only be skillful but personally acceptable—even association with evil scores against us. Like the the smoking parson, the drunken lawyer and the licentious merchant, the dentist of bad character or bad habits will be shunned. He must have clean hands and a clean name to work for clean people.—*Items of Interest.*

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Subscribe for THE DENTAL AND SURGICAL MICROCOSM.

## DIED WHILE HAVING A TOOTH EXTRACTED.

A negro woman recently died in Macon, Ga., while having a tooth extracted. The woman had been suffering severely from an aching tooth, and to get relief her husband called in a physician. It had been the custom of this doctor to administer chloral to lessen the pain in extracting teeth, and in this case he gave the woman fourteen grains of chloral. While waiting for the chloral to take effect he visited another patient, and on his return found the woman in a stupefied condition. With the assistance of the husband he then proceeded to extract one of the teeth. While extracting it the woman struggled and screamed. The husband pointed out to the doctor another offending tooth, and insisted on its extraction. The woman resisted and struggled, but the husband held her while the doctor extracted it. The woman became quiet, and it was soon discovered that she was dead.—*Dental Luminary*.

## LOCAL ANÆSTHETIC FOR EXTRACTION OF TEETH OR PULPS.

| | | |
|---|---|---|
| R | Cocaine hydrochlorate | grs. v. |
| | Acid carbolic xtals | grs. iv. |
| | Gum camphor opt | grs. vi. |
| | Glycerine, pure | grs. xv. |
| | 95 per cent. spts vini Rect. Q. S. add | drs. ii. |

Hypodermic syringe. Inject one or two drops deeply into the gums on inner and outer side of the tooth, and apply over the gums around the tooth, also in cavity of tooth, a piece of absorbent lint or cotton wet in the solution. Wait four or five minutes (by the watch) and the gums can be freely incised and tooth extracted with but little pain.—*Exchange*.

Death Under Pental.—The death of a German opera singer is reported by the *British Medical Journal*, July 9, 1892, to have recently occurred after the administration of pental for the extraction of a tooth. Eight or ten drops were given upon a face-piece and the tooth removed, whereupon the patient fell back with a loud shriek and never recovered consciousness, attempts to restore animation proving of no evail. The official examination showed that the brain, lungs and vessels were healthy. There was, however, some amount of fatty degeneration of the heart, and death was attributed to syncope, probably due to the condition of that organ.

# DIRECTORY OF DENTAL SOCIETIES.

*American Dental Association*—Meets in August, 1893, in Chicago, Ill. Pres., W. W. Walker, Rec. Sec., Geo. H Cushing, Chicago.

*Southern Dental Association*—Meets at Chicago, Ill., 1893, exact time to be decided later. Pres, B. Holly Smith, Baltimore, Md.; Sec., D. R. Stubblefield, Nashville, Tenn.

# STATE DENTAL SOCIETIES.

*Alabama Dental Association*—Meets annually. Next meeting at Birmingham, on the second Tuesday of April, 1893. Pres., C. L. Byoid, Eufaula; Sec., S. W. Foster, Decatur.

*California State Dental Association*—Next meeting will be held in San Francisco, June 8, 1893. Pres., W. Z. King, San Francisco; Rec. Sec., L. Van Orden, San Francisco; Cor. Sec., C, E. Post, San Francisco.

*Florida State Dental Association*—Meets annually. Next meeting at Gainesville, second Tuesday in May, 1893, Pres. B. B. Smith, Gainesville; Sec;, F. E. Buck, Jacksonville.

*Georgia State Dental Society*—Meets second Tuesday in May, 1893, at Atlanta, Ga. Pres., S. M. Roach, Savannah, Ga.; Rec. Sec., S. H. McKee, Talbotton; Cor. Sec., L. D. Carpenter, Atlanta.

*Illinois State Dental Society*—The next meeting will be held at Rock Island, on the second Tuesday in May, 1893. Pres., E. K. Blair, Waverly; Sec., Louis Ottofy, Chicago.

*Indiana State Dental Society*—Meets next at Indianapolis on the last Tuesday of June, 1893. Pres., R. W. Van Valzah, Terre Haute, Ind.; Sec., G. E. Hunt, Indianapolis.

*Kansas State Dental Association*—Pres., J. A. Roberts, Sabetha; Sec., J. P. Root, Kansas City. Next meeting will be held at Topeka, April 25, 1893.

*Maine Dental Society*—Pres. L. S. Chilcott. Bangor; Sec., C. E. Bryant, Pittsfield. Meets on the third Tuesday in July, 1893, in Portland.

*Maryland State Dental Association*—Next annual meeting will be held on the first Monday in June, 1893, in Baltimore. Pres., Thos. H. Davy, Baltimore; Rec. Sec., W. W. Dunbracco, Baltimore; Cor Sec., J. E. Scott, Baltimore.

*Massachusetts Dental Society*—Meets annually in Boston, in June. Pres., Josiah W. Ball, Boston; Rec. Sec., E. O. Kinsman, Cambridge.

*Michigan State Dental Association*—Meets annually. Next meeting at Ann Arbor, Tussday, June 7, 1893. Pres., N. S. Hoff, Ann Arbor; Sec., J. Ward House, Grand Rapids; Treas., Geo. H. Mosher, Jackson.

*Mississippi State Dental Association*—Meets first Wednesday in April, 1893, at Jackson, Miss. Pres., A. A. Dillehay, Meridian; Cor. Sec.; F. E. Smith, Grenada.

*Minnesota State Society*—Pres., C. H. Goodrich, St. Paul; Sec., L. D. Leonard, Minneapolis. Meets in St. Paul, September 6, 1893.

*Missouri Dental Association*—Meets at Excelsior Springs Mo. second Tuesday in July, 1893. Pres., J. D. Patterson, Kansas City, Mo.; Sec., Wm. Conrad, St. Louis.

*Rhode Island Dental Association*—Pres., D. F. Keefe, Providence; Sec, W. H. Carpenter, Providence. Meets quarterly, second Tuesday in July, October, January and April. Annual meeting second Tuesday in July, at Providence.

*South Carolina State Dental Association*—Meets annually. Pres., J. T. Calvert, Spartanburg; Cor. Sec., A. T. Peete, Branchville.

*Tennessee Dental Association*—Meets annually. Next meeting at Chattanooga, first Tuesday in July, 1893. Pres.. S. B. Cook, Chattanooga, Tenn; Rec. Sec., P. D. Houston, of Lewisburg; Cor. Sec., R. R. Stubblefield, of Nashville.

*The Dental Society of the State of New York*—Meets annually on the second Wednesday in May. Next session at Albany, 12th, 13th and 14th of May, 1893. Pres., W. W. Walker, New York; Sec., C. S. Butler, Buffalo; Cor. Sec.. R. Ottolengui, New York.

*Vermont State Dental Society*—Meets annually. Next meeting in St. Albans, Vt., third Wednesday in March, 1893. Pres., George F. Cheney, St. Johnsbury; Sec., Thomas Mound, Rutland.

*Washington State Dental Society*—Meets annually. Next meeting will be held at Olympia, in May, 1893. Pres., Geo. B. Hayes, of Tacoma; Sec., F. P. Hicks, of Tacoma.

*Wisconsin State Dental Society*—Meets annually. Next meeting will be held at Janesville Wis., the second Tuesday in July, 1893. Pres, W C. Wendel, Milwaukee; Sec, C. A. Southwell, Milwaukee.

## LOCAL SOCIETIES.

*Fifth District Dental Society of N. Y.*—Meets semi-annually. Next meeting in Syracuse, October 24-26. Pres., R. F. Jones, Utica; Sec., T. B. Mason, Phoenix.

*Mississippi Valley Dental Society*—Meets annually at Cincinnati. Next meeting March 8th 1893. Pres., O. N. Heise, Cincinnati; Sec., H. T. Smith, Cincinnati; Cor. Sec., W. C Matlack, Cincinnati, O.

*Northern Ohio Dental Association*—Meets annually. Next meeting at Akron, O., on the first Tuesday in May, 1893. Pres., W. H. Whitslar, Cleveland, O.; Rec. Sec., L. P. Bethel, Kent; Cor. Sec., R. H. Barnes, Cleveland, O.

*Odontological Society of Pennsylvania*—Meets on the first Saturday evening of each month at 8 o'clock p. m., at Thirteenth and Arch streets. Pres., James Truman; Rec. Sec. A. W. Deane.

*Odontological Society of New York City*—Meets the third Tuesday of each month. Pres., Wm. Jarvie; Rec. Sec., E. T. Payne.

*Odontological Society of Cincinnati*—Meets monthly. Pres., C. M. Wright; Sec., W. M. Williams.

*Odontological Society of Chicago*—Meets monthly. Pres., G. Newkirk; Sec., E. Noyes.

*Pennsylvania Association of Dental Surgeons* Meets second Tuesday of each month. Pres., H. E. Roberts; Cor. Sec , Theo. F. Chupein.

*Pittsburg Dental Society*—Meets the last Tuesday evening of each month. Pres., J. B. Williams, Homestead; Sec., N. L. Reinecke.

*San Francisco Dental Society*—Meets the second Monday evening of each month Pres., W. A. Knowles; Sec., Chas. Morffew; Treas., J. J. Birge.

*Southern Minnesota Dental Society*—Next meeting in Mankato, second Tuesday in April, 1893. Pres., G. P. Leonard, Waseca; Sec., N. B. Patten, St. Peter.

*St. Louis Dental Society*—Meets first and third Tuesday in each month. Pres., John G. Harper; Cor. Sec., Emma E. Chase; Rec. Sec., DeCoursey Lindsley.

*The Isaac Knapp Dental Coterie of Ft. Wayne, Ind.*—Meets first and third Tuesday in each month. Pres., H. C. Sites; Sec., J. S. McCurdy.

*The Minneapolis Dental Society Monthly*—Pres., E. F. Clark; Sec., E. J. Morrison.

*Washington Dental Society*—Meets second Tuesday of each month. Pres., R. Finley Hunt; Rec. Sec., H. M. Schooly.

*Washington City Dental Society*—Pres., M. B. Noble; Sec., Wm. Donally. Meet monthly.

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THE

# Dental and Surgical Microcosm

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THE controlling Editor, DR. S. J. HAYES, who has devoted many years to the science of Anæsthesia and Anæsthetics, in their relations to surgery, will be assisted by some of the most learned in both the Medical and Dental professions in the United States and in Europe, and the JOURNAL will ever aim to be both progressive and aggressive; pre-eminently scientific and yet independent in all its literature and relations; belonging to no school of Dentists nor Physicians, but advocating advancement and a higher standing for all in their relations to science and art. In brief, it will ever aim to be worthy of its mission and a place in every Physician's and Dentist's library.

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THE

DENTAL AND SURGICAL

MICROCOSM.

VOL. III. APRIL, 1893. NO. 2.

[For THE DENTAL AND SURGICAL MICROCOSM.]

# ANÆSTHESIA.

BY J. M. CLYDE, D. D. S., SPRINGFIELD, MO.
Ex-President of the Mississippi Valley Association.

Much has been written on this subject yet it is not exhausted. The cry is still "more light." Hence, the prime object of what I shall present is to induce you "to give us of your oil."

I believe the science of anæsthesia is still in embryo. The future may reveal things of which we have not yet dreamed. Had we a substance which, administered in some way, would produce complete insensibility to pain and dissipate all fear of surgery by slightly obtunding the mental faculties while the vital organs remain in full operation, we would have all we could desire. This conception may appear utopian, but in the light of progress and the wonderful developments in science and art during the last quarter of a century, especially the last decade, is there one who has the temerity to stake his reputation on the impossibility?

But I do not intend to speculate as to future possibilities. We have to deal with the present.

Anæsthesia is not a dangerous condition if inducted and maintained in harmony with the laws of nature. Every scientist knows that if an electric current be inducted very lightly at first, and gradually increased as the patient is able to bear it pleasantly, we can in a very short time have a volume of electricity passing through the system which, if introduced instantaneously at the beginning, would produce a shock sufficient to destroy life.

Why is this? I can conceive of no solution except on the hypothesis that there is a circulation in the nervous system of a fluid, call it animal electricity, nervo-vital fluid, nerve force, or what you please; that this circulation is primary and is just as essential to life as that of blood; that any sudden disturbance of this circulation produces a shock more or less severe, according to the susceptibility of the patient and the power of the disturbing agent.

Electricity seeks equalization. This is its fundamental law and the secret of its power. It is made manifest by disturbance. The greater the disturbance the greater the manifestation of its power. A large volume of the subtile fluid suddenly inducted into an animal causes death by a sudden disturbance or arrest of the neural circulation, while by beginning with a very light current and gradually increasing as the individual is able to bear it pleasantly, the neural current is stimulated to endure the greater volume. In other words, as the neural circulation is increased the power of endurance, may I say *equalization*, is increased.

Anæsthesia is insensibility caused by some disturbance of the neural circulation. A patient has a want of normal feeling in some part of his anatomy, say his left leg; it is also a little below the normal temperature. You apply electricity to stimulate the neural circulation, at the same time there is an equalization of the blood flow, and the patient no longer complains of coldness or want of feeling.

Hyperæsthesia is the opposite of anæsthesia. It is hypersensibility, and is also produced by some disturbance, a *polarization*, if you please, of the neural current. A foreign substance, for example a splinter, has penetrated the thumb beneath the nail. The neural current is unduly stimulated. Very soon there is a determination of blood to the part and it becomes exceedingly sensitive. By removing the stimulus you equalize the currents and the thumb soon returns to its normal condition. I need not remind you that the nerves control the blood supply. There is no motion of any kind, no exhibition of power, voluntary or involuntary, in which the nerves are not concerned; and as the wires of a telephone system must be alive with electricity in order to perform their work, so it is with the nerves. They transmit impressions from periphery to center and from center to periphery by means of electricity. Does this appear chimerical? Can the phenomena of life be more rationally accounted for on any other hypothesis?

Aye, may not death itself be but the arrest of this electric current, whether it comes gradually, as by wasting disease, or suddenly, as by the assassin's bullet? By wasting disease the fluids of the battery are exhausted, the apparatus worn out; by the assassin's bullet the circuit is instantly broken, every life function suddenly paralyzed. Whether you accept this theory or not, you all agree that an impression made on the periphery of a sensory nerve, is transmitted in some way to the center, and thence an impulse is transmitted through the proper motor nerve to its periphery.

Whence this electric current? It is said that there is a great similarity between the electric organs of the torpedo, a species of the finny tribe, and lung tissue as to cellular structure and the distribution of arteries, veins and nerves. If this be true, it may be safe to infer that the pulmonary organs are the chief apparatus, and that in the changes produced by the free oxygen of the atmosphere coming in contact with the venous blood, electricity is generated. It is thence conveyed to the nerve centers to be distributed to all parts of the body at the demands of life. We know not what life is, but we do know that free oxygen is absolutely indispensable to its existence.

Having said so much by way of introduction, we will now consider anæsthesia as induced by narcotics, such as chloroform, ether, etc.

Admitting our premises, it is evident that to secure the safety of our patient we must guard against any sudden disturbance of the neural circulation; or, if you prefer, too sudden an impression on the nerve centers.

Let us begin with nitrous oxide. This is a chemical compound of nitrogen and oxygen, two equivalents of the former to one of the latter. Its formula is $N^2 O$. This gas has been extensively used by dentists both in this country and in Europe, but is now gradually and deservedly growing into disrepute. $N^2 O$. is not a narcotic as has been generally supposed. So far as animal and vegetable life is concerned, it is an inert gas, as much so as hydrogen, nitrogen, or any other inert gas. It contains no free oxygen, nor is the heat of the body sufficient to decompose it. It is inhaled or exhaled as $N^2 O$. During its administration air is carefully excluded. No free oxygen, the life-giving element, is admitted. Now it is evident that if no free oxygen be admitted to the lungs, the formation of carbonic acid, as well as other changes, must cease, and that the generation of animal electricity must cease also. The blood soon becomes loaded with impurities for want of oxygenation, and the tissues suffer. This is asphyxia. The shock to the nervous system, especially of the delicate and nervously constituted, is far greater than we are accustomed to suppose.

It has been demonstrated time and again, within the past few years, by scientific men, both in this country and in Europe, that small animals, such as rabbits, rats and mice, will live just as long in an atmosphere of carbonic acid gas, hydrogen gas, or nitrogen gas as in one of pure nitrous oxide. It has also been demonstrated that an animal will live just as long and *behave* in the same way in a mixture of $N^2$ O., and oxygen in the same proportion of four to one as in the same volume of air ($N^4$ O.) This proves that $N^2$ O, is an inert gas, and has in itself no life-giving power. It also proves that the insensibility caused by its inhalation is just the same as that produced by the inhalation of carbonic acid gas (C. $O^2$ ), hydrogen, nitrogen, or any other inert gas. It also proves that $N^2$ O. is *not* a narcotic; for if it is, then nitrogen, which constitutes four-fifths of the atmosphere, and which we are constantly respiring, is a narcotic. This is what the logicians call a "reductio ad absurdum."

How then. does $N^2$ O. produce insensibility? The answer is plain. By *asphyxia*. A paralysis in a greater or less degree of every life function, "a step in at death's door." A condition of imminent danger. If a patient die during its administration, he dies by asphyxia just as surely as though he were drowned in the midst of the sea. Dr. Richardson, of the Royal Medical and Chirurgical Society of London, recognizing this fact, says that "its use for the pretended purpose of producing anæsthesia ought to be prohibited by law."

It has been argued by the devotees of $N^2$ O. that since this gas contains a larger proportion of oxygen than the same volume of air ($N^4$ O.), therefore it will support life. This is a serious mistake, as has been already proved. Besides, $N^2$ O. is a chemical combination in which the oxygen has a greater affinity for the nitrogen than it has for the constituents of the blood; hence, there is no free oxygen. On the other hand, air ($N^4$ O) is simply a mechanical mixture in which the oxygen is free.

Pardon me for dwelling at such length on $N^2$ O. I have done so because it is still recommended by many physicians and dentists as perfectly harmless. True, it is seldom that a patient dies in the chair, but who can number the thousands that have been injured, both mentally and physically, and sent to a premature grave by that asphyxiating agent.

We shall now consider chloroform (C. H. $Cl^3$ ). It is prepared from alcohol and *is* a narcotic. It is a chemical compound of carbon, hydrogen and chlorene, in the proportion of one equivalent of carbon, one of hydrogen and three of chlorene. It is customary to talk of such agents as anæsthetics, but there is no such thing as an anæsthetic administered through the respiration without a due admixture of air. Indeed, this is the all-important element, for unless we dilute the narcotic with sufficient air to maintain the red globules of the blood, we may have asphyxia, but cannot have anæsthesia. Besides, by the rapid breathing of air alone a considerable degree of analgia may be induced. This is easily demonstrated. Make a forcible respiration every second for about one and a half minutes, and keep it up through the operation, a tooth may be extracted, an abcess opened, a hypodermic needle inserted, or any other short operation performed without pain. But here is the difficulty. Very few have the will power to make rapid breathing a success. They stop before the analgesic effect is reached. Hence the necessity of a narcotic as a supplementary element of the anæsthetic.

Anæsthesia affects the entire system, but not equally. Were it not for this fact, this condition would be incompatible with life. So long as the medulla is sufficiently active to send out the neural current at the demands of life, these organs will perform their functions though in a modified degree. This is just what we ought to have, viz., all the vital organs in a state of modified activity while at the same time we have a condition of complete insensibility. To carry a patient to this point and no further requires great care and attention. As another has said: "It is no fool's play."

All recognize the theory that if an impression be made on the periphery of a sensory nerve, as for example a burn, it is conveyed by the sensory to the brain, thence an impulse is transmitted through the proper motor nerve to enable the muscles to resist the impression and protect the injured part; but if the impression should be so sudden and powerful as to paralyze the nerve center, there would be no reflex action. I believe in animal electricity, and that under its control these and all other functions of life are performed; and just as the finest telegraphing instrument ceases to operate the moment the circuit is broken, so life is in imminent peril the moment the medulla is paralyzed.

Chloroform is a powerful narcotic. In a very delicately organized, nervous patient, one or two inhalations of an over-charged atmosphere may produce such a shock as to paralyze the medulla and cause death at the beginning. It is estimated that the lung cells of an ordinary sized man, spread out on a plain surface, would require an area of about 1400 square feet. These cells are covered with a complete net-work of filaments of the pneumogastric. Imagine 1400 square feet of the periphery of a sensory nerve exposed to the action of such a powerful drug as chloroform. Is it any wonder that the sudden induction of an over-percentage should produce such a shock? To avoid such a catastrophe we should induct chloroform *just* as we do electricity, begin with a very low percentage (say one per cent), and gradually increase as the patient is able to bear it pleasantly. Acting on this principle, there can be no shock, no paralysis, no arrest of the neural circulation, and consequently no death. Death may occur, but it will be from some other cause. A person suffering from fatty degeneration of the heart, in an advanced stage, is liable to drop at any moment. Such a one is a very undesirable patient on whom to operate under any circumstances. Yet may it not be that even he would be safer under an anæsthetic properly administered?

Again, with very delicate and nervously constituted patients, especially females, mental impressions are a potent factor in producing shock and sometimes fatal syncope. Persons easily affected by the sight of blood, a terrible tragedy, hearing sad news, or easily frightened, belong to this class. With such the fear of the operation may have a terribly depressing effect. To manage such cases the anæsthetist should not be in a hurry. He should tax his ingenuity to dispel their fears and inspire them with confidence. This accomplished, he may safely begin, continuing his words of encouragement until he has carried his patient beyond the possibility of mental shock.

The next point demanding his attention is to guard against an over-dose of the narcotic. In complete anæsthesia the mind is entirely cut off, has no cognizance of what is going on, is, as it were, absent from the body; hence there is no consciousness of pain.

As soon as his patient has reached this state, he should suspend until signs of returning consciousness are manifested, otherwise he may so fill up the cells of the lungs with the narcotic as to prevent the admission of oxygen to the blood· This would soon result in asphyxia, paralysis and death.

From what has been presented in this paper, it is evident that the chief points of danger are *shock* at the beginning and *asphyxia* at the end. To avoid these the anæsthetist should give his whole undivided attention to his work. It is much easier to steer clear of a whirlpool than to escape after being caught within its circling tide.

To accomplish the work thus briefly outlined, it is necessary that we have *some* suitable apparatus. The ordinary methods of giving chloroform or ether on a towel, a sponge or a cone are wholly inadequate. There is no amount of learning and experience that will qualify the anæsthetist to know with any degree of certainty what percentage of the narcotic he is administering at any time during the progress of the anæsthesia. An apparatus adapted to this purpose is just as indispensable as a thermometer is to indicate the temperature of the weather or that of a patient during fever. Who would think of measuring the velocity of the wind by a *guess?*

All agree that to be safe in the administration of chloroform it is especially necessary to begin with a very low percentage (say one per cent), and gradually increase, and that at no time should it exceed three or four per cent; yet, for want of something better, they relegate this absolute certainty to an untrustworthy guess. But we need guess no longer. We have an apparatus which meets all requirements. It needs only to be seen and understood to be appreciated. It is the invention of Dr. S. J. Hayes, of Pittsburg, Pa. Its mechanism and *modus operandi* are based on the indisputable principle that there is no such thing as an anæsthetic without sufficient air to support combustion and maintain the integrity of the blood; that air is the all-important element, the *sine qua non* of the anæsthetic. It generates the anæsthetic as it is used, the percentage of the narcotic being always at the command of the administrator. If it be chloroform, he can begin with about one per cent and gradually increase as the patient is able to bear it pleasantly; hence, there can be no shock, as is frequently the case with the ordinary methods of exhibition. I am using this apparatus in my practice and can most unqualifiedly recommend it to all who have occasion to administer anæsthetics, as a conservator of life and health, as well as for its economy in the use of the narcotic. Changes may be made in its construction, but the fundamental principle must remain. It shows that a great advance step has been taken in the science and art of anæsthesia, worthy the confidence and serious consideration of every philanthropist.

## NERVOUS FORCE.

BY PROF. W. C. BARRETT, M.D., D.D.S., BUFFALO, N.Y.*

There are two things of which I wish to speak, and these two things make up the sum of the whole universe so far as man can know: they are matter and force. I say the study of these must form the whole, the entirety of human research, so far as any positive knowledge, or the hope of definite information is concerned. We may speculate and theorize and dogmatize upon things spiritual and metaphysical as much as we like, but concerning them we can by no possibility, arrive at any definite conclusion, nor can we *prove* any assertion, it matters little how wild it may be, as either absolutely true, or false. When we come into the domain of physics we are studying the actual, the real, the tangible.

I desire, then, for a few moments to consider, in a general way, matter and force—the one real, positive, palpable, inert; the other immaterial, ethereal, incorporeal; yet dominative over the tactile mass; a law which is ever active in bringing about definitive changes in the passive matter; a ghostly, pervading something, which changes a dead, a lifeless, an inanimate mass of chaos into this world of life, and joy, and beauty, and animation.

What is this mysterious influence that we call force? Let us examine it. But in what I shall have to say, I desire it ever to be borne in mind that I am speaking solely of physics, and that it has no kind of metaphysical, or speculative application whatever. The relation of mind to matter it is no part of my present plan to endeavor to trace out.

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Force can be studied only through its chief resulting phenomenon—motion. We find that matter and force are infinitely opposed. Matter seeks eternal rest; force, perpetual motion. They mutually react upon each other, matter being by force constantly changed in its characteristics, force by matter continually varied in mode of manifestation. They are thus mutually interdependent, co-existent, eternal parts of one stupendous whole. Interdependent, because one cannot form a portion of this universe without the other; co-existent, because each pervades the other, and eternal, because both can die only together.

It has long been an axiom in physics that matter is imperishable. The same train of reasoning which proves this, establishes also the fact that force is indestructible. If an atom can change its condition only through the exertion of force, if its form only can be altered, the bonds which unite it to certain other atoms only be liberated to enable it to form new unions with yet other atoms, and if not one of these particles can be lost or annihilated, then can force only, by the reaction of matter, be induced to change its mode of manifestation or its direction. If not an atom has ever been destroyed since matter existed, then it necessarily follows that not an influence, not a wave of force, has ever been extinguished since, simultaneously with matter, it first exerted sway. We may, through the action of force, alter the condition of matter; we may, through the reaction of matter, change the character of force; but both are alike indestructible and eternal. Matter is all one, under whatsoever form it may exist. Force is a unit, however it may manifest itself. These are predicates, truisms, self-evident, self-proved, fixed laws of physical science. This doctrine is not new, for as long ago as 1845, Faraday declared that he held the opinion that the various forms under which the forces of matter are made manifest have one common origin, and are so mutually interdependent that they are convertible one into another, and possess equivalents of power in their action. To my apprehension, matter and force are as intimately connected as are what Faraday calls the different manifestations of force with each other. We cannot conceive of matter except it be subject to force. We cannot imagine power as distinct from the matter upon which it acts. They are essentially co-existent, coeval, synchronous.

Force may act upon matter in different ways, and the result may be motion of a mass, or of atoms. The changes consequent upon this action may be those of external form—morphological—or of internal structure—molecular. According to the peculiar manifestation of it we have been accustomed to call it Heat, Light, Electricity, or Chemical affinity; but in whatever mode it becomes sensible to our preceptions there is one definition which will always describe it, one expression which always characterizes it. It is essentially matter in motion. Heat was formerly regarded as a subtle substance, with unknown, tangible qualities, and its specific name was *Caloric*. It was, with Light and Electricity, classed as an imponderable fluid, because it was conceived that no other hypothesis would account for the phenomena which it exhibited. Light, it was supposed, consisted of minute characteristic particles which proceeded from the sun, or from any luminous body. Electricity also was regarded as an invisible entity of some kind, possessed of peculiar qualities. It was known rather by its physical manifestations than from any knowledge of its character, but the general opinion held it to be an extremely tenuous matter, which, while pervading most substances, could yet be bottled up, confined, or dissipated at will. It was usually spoken of as the electric *fluid*, and in my early school days, I was taught that there were two kinds of electricity—a positive and a negative—which were always seeking to neutralize each other. Further study and investigation made manifest the absurdities of these crude theories, and a new hypothesis was invented—that all these supposed entities, these actual, positive existences of some kind of matter called light, heat, etc., really acted through a specific media—a fluid which pervaded all matter and all space, an invisible, intangible ether, which once put in motion by the action of light, heat, or electricity, had sufficient power to produce all the violent phenomena which were supposed to be the effects of these agents, and this hypothesis is held by most people to-day.

Count Rumford disposed of the material theory by immersing two iron or steel bodies in cold water, and then, by the friction or attrition of one upon the other, gradually raising the water to the boiling point. This was the initial attempt at removing the consideration of the study of force from the domain of metaphysics to that of physics, Prof. Grove first publicly announced the modern theory that the so-called imponderables—light, heat electricity, etc.—are peculiar states of ordinary matter; that they are resolvable into motion, and that they are, in fact, all very closely connected, and the new doctrine was denominated the Correlation of Physical Forces. The theory was taken up by others, the real nature of the so-called forces was studied, and the further proposition was enunciated that they are all mutually convertible into each other. It was necessary in the consideration of these forces to study them in their manifestations, to compare them with other physical phenomena, and note their resemblances or their discrepancies. It has been determined that most, if not all the forces, progress by means of an undulating or wave-like motion, not unlike the advance of the concentric waves made by casting a stone into a smooth body of water. This hypothesis is firmly established as regards sound, not only by actual measurement of the vibrations of resonant bodies, but by the very structure of our own auditory apparatus.

The vibrations produced by light have not only been demonstrated, but accurately measured. And not only this, but it is very clearly shown that the different colors of the solar spectrum are produced by a definite number of vibrations upon the retina of the eye. Further, the very number of these wave-like beatings have been ascertained and counted. The most delicate, but at the same time the most determining experiments have been conducted, and these demonstrate that to produce the color at one end of the solar spectrum, red, 480,000,000,000,000 of these vibrations must impinge upon the retina in each second ; while to produce violet, the color at the other extreme of the spectrum, the number of vibrations per second is no less than 720,000,000,000,000.

The same arguments which are applicable to the undulatory theory of the progress of light, are equally pertinent in the consideration of electricity, for its mode of progression has been shown to be nearly allied to that of light.

And now let us for a moment consider the characteristics of some of these forces. Sir Humphrey Davy says that the immediate cause of the phenomena of heat is motion, and the laws of its communication are precisely the same as the laws of the communication of motion. We know that all molecular movement is accompanied by the evolution of heat to a greater or less degree. This is equally true whether it be of the changes incited by what is known as chemical action, or the motion induced within the mass of iron upon the blacksmith's anvil. We also know that the same molecular disturbance generates what is known as electricity, and that both these elements are operative in inducing that change sometimes called chemism. It is equally true that each of these forces is convertible into any of the others. Thus, if we commence with chemical action, we all know how, within the cells of the battery, this action is made manifest in the electrical current, and thus chemical force is converted into electrical force. If, now, this force be generated in sufficient quantities and conducted along a wire of sufficient size for its easy transportation, and if in this "circuit" a piece of small platinum wire of such size as to partially obstruct the "current" be inserted, we all know that the platinum wire soon becomes red hot, and we see an instance of the conversion of electrical force into heat. The galvano-cautery is an instance of this. If, now, the current be increased and the obstruction be entire at one point, the most dazzling radiance is manifest, and here we have an instance of the conversion of electricity into light. The electric light is an illustration of this.

Here, then, commencing with that simple molecular disturbance within the battery, we see the force generated by those movements manifested first as chemical action. This is converted into electricity, the electricity into heat, and the heat into light, and all without the addition to or the subtraction from the original force as first made manifest, of anything whatever. This proves conclusively that whatever name we may give the phenomena exhibited, they are all due to the same cause, have the same origin, are convertible the one into the other, are in fact all the same thing, differing only in the mode of their manifestation and the accompanying phenomena.

The sun is the great source of light and heat for this earth. The so-called rays of the sun may be made manifest to us in many different ways. If, for instance, we take our stand with that body exposed directly over head, its influence is chiefly exhibited to us through that which we call heat. But we may interpose between us and the sun crystals of alum, and these will intercept those undulations which are known to us as heat; or, in other words, it will so change the character of these vibrations that the sun's influence is no longer manifest to us as heat, but the heat rays have become light beams. In other words the heat is converted into light. Again, we may interpose another substance and there is neither heat or light in the sun's influence, but its rays now induce those molecular changes which we know as chemical action. Thus the same ray of the sun may be changed and made manifest to us as light, heat, chemism and electricity.

Force, then, is but a mode of motion, and according to the manner in which it is manifest to our senses we call it by the names which I have considered. But force may remain latent for an indefinite time. In my school-boy days, when we considered heat or caloric, we called it either sensible or latent. Further study will teach us that such terms are the result of our lack of understanding of the subject. There may, in one sense, be such a thing as latent force, but heat is only a method of the manifestation of force. The sun, as I have said, is the origin of all force, because within its body certain changes were originally organized and put in motion, whether by Omnipotent Power, as our system of theology teaches, or by inherent qualities, as materialists claim, matters not in this connection. These molecular changes are the origin of the unit force. The effect of these changes is eternal, imperishable, indestructible. But they are not necessarily incessant. They may be stored up, imprisoned, only to be liberated through the transference of some other influence, as thus: In the early carboniferous ages, the force liberated through the changes going on within the sphere of the sun being manifested upon the earth as light, heat, and chemism, induced certain molecular changes here, which resulted in the new combination of the elements of matter then existent, and the consequence was an extraordinary organic growth, and the formation of the carboniferous forests. The continued force which has its initial point in the sun, still active, but modified by previous changes of the same matter, and by self-limiting, environing circumstances, finally resulted in those immense carbon deposits which to-day form our coal fields. The coal which burns in my grate is but the imprisoned force which was originally derived from the sun, and which came in the form of light, heat, electrical and chemical changes. For the proof of this we have but to subject it to favorable influences and there will be returned to nature the same identical light, heat, chemical and electrical forces which so long ago lay inactive, dormant, latent, imprisoned within the coal bed. It is capable of demonstration that the amount returned is the exact amount so long ago received from the sun. But the light, heat, etc., or in other words the force liberated in my grate, is not lost or wasted, but is absorbed, appropriated, perhaps imprisoned within other masses of matter, to be in turn again yielded up, and again utilized. Or, it may be, the force so eliminated from the coal is at once made manifest in some other mode of motion, and thus transmitted on, and on, now exhibited as heat, now as electricity, and again as light or chemical affinity.

I might enumerate innumerable instances wherein one manifestation of the unit force is changed into another. I might speak of the heat, the light, and the electricity, which in various ways accompany or are the result of all chemical action.

I might show that electricity, and light, and chemical action, are ever attendant upon the development of heat, and that heat, and light, and electricity, are the accompaniments of the development of chemical action ; but it is all summed up in the declaration that all movements of matter, in whatsoever way they may be brought about, are producers of the unit force in some one or more of the methods of its manifestation. I cannot open or shut my jack-knife without the evolution of heat and electricity in greater or less degree. If I bring the blade of my knife in quick, sharp contact with another substance sufficiently hard and brittle, heat and light are made evident to the senses, as in the use of the flint and steel.

The evolution of force and its methods of manifestation, are controlled by definite laws which are as yet in a great degree unknown to us. Prof. Grove says, that the law or rule as to the production of heat or electricity from friction or percussion is, that where the mutually impinging bodies are homogeneous, heat is the consequence; but where they are heterogeneous, electricity is evolved, although either is in a greater or less degree the constant accompaniment of the evolution of the other. In fact, it is true that the production of one force or mode of motion is, as a rule, occompanied with more or less of the others. The beautiful photographic process, which is but the conversion of light into the molecular motion commonly known as chemical action, is accompanied with the evolution of heat and electricity, though in quantity not appreciable to anything but the most delicate apparatus. If I bend a poker across a chair back, the molecular disturbance of the iron, if it be measured by thermometers and electrometers of sufficient delicacy, will distinctly show an alteration in temperature and electrical condition; and this is true of every change in the relation of the atoms which go to make up matter.

Matter is composed mainly of four simple elements: oxygen, hydrogen, nitrogen and carbon. Of these four, three are gaseous, and their atoms move freely, and with little friction. Many of the compounds of these elements are what is called allotropic or isomeric—that is, two bodies are composed of exactly the same number of atoms of each element, and yet they are totally unlike because the relation of the atoms is not the same. Thus the oils of turpentine, lemon and juniper, are chemically the same, yet physically different. So that it is seen that very slight atomic or molecular changes produce wide divergencies in the character of compounds. Then too, there is abundant opportunity for such changes to be brought about by a very slight exertion of force. The compounds of nitrogen (and this includes all the so-called albuminoids) are very unstable, and are ever seeking for some more permanent union. The exhibition of the slightest force is sufficient to induce a disruption of imprisoned chemical affinities which may result in wide changes.

Again, compounded matter exists in a number of forms, as gaseous, liquid, and solid. Of these the first two are easily impressed, and molecular changes are constantly going on. Solid matter exists in two different states—the colloid and the crystalloid. Of these the first is unstable and exceedingly mutable. So that of all the forms in which matter exists there is but one in which it is not easily changed and made to assume new molecular conditions. We have shown that every molecular disturbance, however induced, is followed by the evolution or the transference of some one or more of the various manifestations of force. Given then, that most forms of matter readily undergo molecular and other changes, and that the manifestations of existent force, such as light heat, chemism etc., are constantly active, and that such action can by possibility only result in still another transference of force, it may readily be seen how unceasing must be the phenomena presented by all these mutations and mutually induced changes. Every wave of force exerted at the initial period of this universe has been, since that time, and will ever be existent, and either constantly, actively excited, or passively imprisoned by superior force. Matter is, under the action of force, constantly being disintegrated, and its constituent particles built anew into fresh forms. And so. this tearing down and redistribution of matter is, under the dominion of force, constantly going on.

Every organized being, whether animal or vegetable, has its period of molecular aggregation, of growth and so-called nutrition, of active, progressive changes, and then the same forces which have resulted in the combination of the molecules which make up its substance, are again active in those yet further molecular changes which bring about its morphological destruction. I say the same forces which brought together the molecules which composed this body of mine, will in time insure their separation, and thus bring about the disintegration of solid and fluid tissues, and return them again to the common stock of matter, while the energies which brought about these definitive changes, through the reaction of the matter thus metamorphosed, will in time be transformed into other forces, and itself returned again to the parent or unit force whence it was segregated, and thus will all that which goes to make up this Ego, this individual I, be returned again to that great source from which it emanated.

If this dictum of the unity and the conditions of the forces be admitted as true in its application to the various forces of which we have been speaking, are we not justified in assuming that the law is general throughout the material universe? And whether we study this unity as exhibited in the macro-cosmos, or in the micro-cosmos—in the revolutions of solar systems, or that affinity which binds together two atoms—in those early convulsions which resulted in the upheaval of continents, or the change which culminates in the growth of a blade of grass—in the devastating earthquake, or the fall of a leaf in autumn—in the wheeling in infinite space of a planet, or the infinitesimal vibrations of a ray of light—in the action of volcanic fires, or the molecular changes within the single battery cell, we shall see that in any extreme it unfailingly exhibits the same characteristics. It is the exhibition of the same force which results in the molecular aggregation called man, and that of the lowest organic life. Within the two organizations constant definitive changes are going on that differ but in degree. The results of those changes in the two are precisely alike in fact. Life, vitality, in the one is, in a physical sense, precisely what it is in the other, except that in the lower it is simple and all the processes are elementary, in the higher it is complex and not readily comprehended.

And now, having considered the law of the correlation of forces in its application to the lower forms of matter, shall we stop when we are just upon the threshold of the secret places of nature? We have shown that in inorganic life the law prevails and answers all the phenomena there exhibited. Shall we admit that the harmonies of nature, become discords when they are played upon the strings of a more perfect instrument? As we rise in the scale of existence, shall we conclude that where, before, all was beauty, and harmony, and exactness, now all becomes discord, and falsehood, and incongruity? Shall we admit that the laws which are universal in the lower objects, are suspended when we arrive at the point where they are most needed to make things congruous? The world has long accepted as a fact the belief that man is a law unto himself, and that his physical being is not subject to the rules which govern all the rest of creation. The life of one of the lower animals, was thought to be one thing, that of a man to partake of a very different essence. That the vitality of the shrub which grows by the wayside, had no kind of resemblance to the flower which blooms in our gardens. Let us look into this thing.

My subject, as announced, is nervous force. Perhaps many of you have wondered if I were to pay it the respect of a passing glance, and if so, what my long prelude meant. It was necessary that we first establish and make clear to your comprehension the doctrine of the correlation of forces, before we attempted to apply it to other and higher uses.

We have seen that the light and heat of the sun, under favoring conditions, have developed or been transformed into other forces. We have examined those forces, and have found them a unit in their origin, though diverse in their mode of manifestation. We have seen that light may be changed into heat, heat into electricity, and that into chemical affinity. That all these so-called forces are mutually interchangeable, alike, identical. That each is the result of certain molecular changes, themselves induced by manifestations of other varieties of the unit force. We know that all organic bodies, whether of low or high degree, are composed of the same atoms that unite to form other matter, and, therefore, they must be amenable to the same laws.

There are certain phenomena connected with living matter, called vital phenomena. Under the old hypothesis that there were many kinds of force, and that each was an entity, acting in an independent manner upon such matter as was subject to its influence, it was easy to suppose that nervous force was a something distinct and by itself, and that it was not subject to the laws which governed other forces. When it was believed that magnetic attraction was a pervading something which established a kind of affection between certain substances, and aversion toward others, and that this attraction was a thing by itself, dominated only by its own laws, and owing no allegiance to the principles which governed the relations of other matter, then it was easy to imagine that nervous force was a principle alike distinct, separate, and removed from all other dominant forces. In that early day there was no harmony in nature, but a continued clashing and discord among mutually contending forces. Let us now suppose that nervous impulse is but another mode of manifestation of the unit parent force, and how quickly all becomes harmony and beauty.

The lapse of time admonishes me that I cannot pursue this inquiry with all the minuteness with which I endeavored to examine the physical forces, but that *all* force is identical, interchangeable, and the same, seems to me plain from a number of reasons. In the first place it is derived from the same source. The same molecular changes and mutations which in the battery cell result in the evolution, or more strictly speaking, the segregation of electrical force, here is manifest as nervous force. We are constantly supplying the elements of this nervous battery, in the food which we take, and these molecular changes which we denominate digestion and assimilation, result as such changes ever do, and must result, in the elimination of a force which, in this method of manifestation, we call nervous force.

If an animal be deprived of every kind of food except fats, it finally dies of inanition, though there is no apparent emaciation. The changes incident and necessary to nutrition cannot be carried on in the absence of necessary elements. So the molecular changes of the digestive process having partially ceased, there is a consequent diminution in the evolution of nervous force, which finally results in complete functional stasis, or death.

Again, that nervous force is identical with the other forces is manifest from the fact that in many of its phenomena it is the same. As light and heat are modified by other forces, as well as by the circumstances under which they are made manifest, so nervous force is dominated by the environments which surround its elimination and exhibition. The methods in which the changes which result in light and heat progress, the elements taking part in such changes, all have an influence upon the characteristic of the force so generated. This is also true of nervous force. When the molecular changes going on within the body in which is generated nervous force, are most active, the force generated is great. When these changes cease, nervous force is no longer generated, and the body is dead. When the products of these changes, are for any reason, transformed into heat, as in certain pathological conditions like fever and inflammations, nervous force is decreased. If the body be subjected to intense cold, the transformation of these changes into force, is retarded, and not only is the temperature of the body, reduced, but nervous force is diminished, and the organs which are controlled and regulated by it, become torpid. Certain drugs have the power entirely to suspend these transferences of force, or to modify them greatly. So in the generation of other forces through the chemical or other changes which induce them, the elimination or action may be modified or suspended by the introduction of interfering matter.

Nervous force may be changed into other forces, and on the other hand, light, heat and electricity may be transformed into nervous force. It is not sufficient that the tadpole be furnished with the necessary food and heat for its development into a frog. Unless light be given him he remains in his tadpole state. If heat be not supplied to the freezing animal there will be no nervous force, and how familiar is every physician with the fact that when nervous force seems exhausted, the mere application of heat supplies the needed nervous impulse; how else than by a transference of the force? If I apply the poles of a powerful battery to the nerves of an animal in which the evolution of nervous force is quite suspended, all the effects of that force are manifested. The heart can be made to beat, and any special muscle to act as in life, for a limited time; how else than by the transferrence of this mode of manifestation of the unit force? Electricity seems more nearly correlated to nervous force, than is any other mode of motion. Indeed, in some animals they seem interchangeable at will. Thus the gymnotus, or electrical eel, by the possession of a more than usually complicated nervous apparatus, can give electrical shocks of considerable power at volition.

The fire-flies and glow-worms are also provided with special organs by means of which they can at will emit light, as the gymnotus does electricity; that is, nervous force is transmitted into light. In all such animals, when nervous force is exhausted, when they are tired out by continued irritation or excitement, this power to emit light or electricity is gone, and it returns only when the nervous impulse is again perfect.

The laws which govern the manifestation of nerve impulse, are less understood than those dominating the other forces. The force itself seems, like an algebraic expression, to be raised to a higher power, but that it therefore differs from the others does not follow. When in the light of the theory of the correlation of forces it is intelligently studied, we may hope that its phenomena will be better understood, and its conservation become a wrought out problem. We have learned how electricity may be stored up, imprisoned against a time of need. Why should we not discover the same thing concerning its nearly related nervous force? When the battery ceases to work we know how, within certain limits, to remedy the defect. What hinders our learning the same thing of the nervous system? Many men have striven to gain this knowledge, but not, so far as I know, in the light of the latest revelations of science. Nervous force has been regarded as electricity once was: as an entity, an entirety; as something distinct from other forces. It is time that men began its investigation from another standpoint.

In the first pages of this hastily written paper I said that the progression of force is, so far as we now know, by undulations, and onward, wave-like motions. This is by experiment demonstrated to be true of nervous force. Even the rate of this advance, has been determinately measured, and found to be in the motor nerves about 110, and in the sensory nerves about 140 feet per second; so that we see in its mode of progression it obeys the law governing other forces.

Of the manner in which nerve force is eliminated we know little, but that it is in some way through the nerve centres we are convinced. Experiment has proved this, and at the same time established the fact of its close correlation to the other forces. When the nerve eenters are destroyed or paralyzed, not only is the production of nerve force stopped, but the body quickly cools. Upon sending a current of electricity along the course of the nerves, the bodily heat or temperature rises, so closely are these forces connected. If an organic body be deprived of light, not only is nervous force diminished, but the temperature is lowered.

We have all known persons whose hair during conditions of nervous excitement would stand on end, and from whom at such times could be drawn distinct electric shocks. I know a man who, by inducing a restless, agitated nervous state in favorable atmospheric condition, can light a gas jet by simply holding his finger tip up to the burner. These states are always succeeded by nervous depression, undoubtedly due to a loss of nervous power, through its transmutations into electrical force.

That nervous force is very closely correlated with electrical force is again proved by the fact that all persons of highly wrought nervous organization suffer extremely during electrical disturbances. So-called magnetic storms induce a condition of great nervous exaltation in many people. Nervously anæmic people derive strength from a gentle electric current, because of its conversion into nervous power. People who suffer from nervous irritability, find an exacerbation in electricity. That is, when the lesion is of the nerve centres, the generators of nerve force, electricity is beneficial; when in the conducting nerve filaments, it is aggravative, for obvious reasons.

There are many other points and arguments which I should be glad to present, but this paper is already too long, and I must leave the consideration of the subject. I desired to say something concerning a kind of nervous ebb and flow in certain of the vegetable kingdom—to speak of the stinging nettles, and of certain jelly-fishes which without a discoverable nervous system, yet give distinct shocks through some occult means—to speak further of the inordinate waste of nervous force in certain states of excitement or passion—to say something about the anatomy of the nervous system, and to examine a little the phenomena of excessive nervous irritability. I am even leaving almost untouched one great division of my subject—nervous lesions. I can only plead the vastness of the subject, and the impossibility of doing more than to make a brief presentation of it within the limits of a paper like this.

The importance of a more careful study of the physiology of nervous forces, is apparent when we remember that the type of American diseases, is to-day distinctly nervous, and that from year to year it is growing more so. Reflecting men in the medical profession, have begun to recognize that we are making little progress in learning to combat these ills, and are seriously looking about for the reason. Some of the most profound thinkers in medicine, have turned their attention almost exclusively to this field. They have advanced little further than to discover the cause of certain troubles, and lament the inability of the profession to grapple with and overcome the difficulty. Books have been written which have stirred medical men up to a recognition of the importance of this subject, without convincing their authors that they themselves fully comprehend the matter. Is it not time that investigation began from a new standpoint? Is it not time that inquiry took another direction? If any one has studied the subject from the vantage ground of the correlation of nervous impulse with the other forces, I am not aware of it; but I hope that this may be a door which shall enable some one to enter upon a field that will give richer returns than any have yet yielded.

## PERSONAL CLEANLINESS.

This ought to be of interest to every dentist. It is of the utmost importance, and means, oftentimes, success or failure. Some people are naturally careless and uncleanly, and can't appreciate the nice distinction between being clean and orderly; they should reform. Others again, are unclean because they allow the push of a business that requires all their time, to interfere with order and the necessary attention to decent toilet preparations. The man who is unclean because he knows no better, or it is a part of his make-up, may be excused, perhaps, more than one who allows the demand of business to encroach upon the requirements of decency so much as to neglect to keep himself and his surroundings acceptable to his patients. If you have no time to keep your office clean, employ an assistant to look after this; and perhaps relieve you of some other unnecessary labor, in order that time may be had in which to make yourself acceptable to your patients. A carefully trained office assistant is a necessity and a blessing, as well as a luxury.

RATIO OF PHYSICIANS TO POPULATION.—Dr. P. H. Millard, of Minnesota, (*Med. Review*), in a paper recently read before the American Academy of Medicine, gave the following as the ratio of physicians to population in various parts of the world: Sweden, 1 to 7,000; Italy, 1 to 3,500; Germany, 1 to 3,000; Austria-Hungary, 1 to 2,400; France, 1 to 2,000; United States, 1 to 600.

[For Dental and Surgical Microcosm.]

# ANÆSTHESIA.

BY J. R. SIMMS, A.M.,M.D., CHICAGO, ILL.

The greatest discovery of any age, can truthfully be said to be that of Anæsthesia; preventing as it does much human suffering. Consequently the greatest benefactor of his race, was he who not only discovered but made it known to his fellow man.

As a white-robed angel of love and kindness on the dewy wings of thought, dispensing mercy with gentle influence upon the timid sufferer, to the mangled, bleeding forms on the cruel field of battle, or on the dreaded table of the surgeon, so that they can sleep and dream all unconscious of their frightful mutilations, comes the discovery of *Anæsthesia*.

While clouded with more or less of doubt, is the name of the original discoverer of Anæsthsia by etherization, thrown upon it by those who might further their own selfish interests and, perchance, fame disregarding truth and justice, perhaps one fact remains, that Wm. Thos. Green Morton, by his public demonstrations of the anæsthetic effects of the vapor of ether, at the Massachusetts General Hospital, in Boston, October 16, 1846, was the one to whom the honor—the high honor—should be due. From this dates the promulgation of that discovery which possibly has done more than all other discoveries for the welfare of the human race. Therefore, the 16th day of October, 1846, stands out like a grand monolithic monument in the sands of time—as does the name of *Morton*—a monument of oratory and eloquence.

Contrast, if you please, the *Then* and *Now !!*

*Then.*—Let us suppose, a modest, timid woman, with a meek, imploring look like the air of a startled fawn as her gaze meets the inquiring eyes of those around, is brought to the surgeon's table. Stimulants and opiates have been freely given her to nerve her for this trying, painful, dreaded ordeal. She may be cheered by words of comfort and assurances; may be told that it will soon be over and she forever freed from her affliction; she may be importuned and besought to be quiet and calm, and with ready assistance at hand to control by force what *willpower* may fail to accomplish, the operation is commenced. Of what avail her courage, her determination! The first keen cut of the razor steel unnerves her, agonizing screams, convulsive contortions, an abandoned endeavor to thwart the cruel knife. She seeks to leap away from her ruthless tormentors. But physical force is engaged to prevent this; strong men do their bidding and pinion her fast. They cannot still her shrieks which curdle the blood of the bravest and compel each heart to silently plead to high heaven to save them and theirs from such a doom. At length, it is finished and past—quivering with pain, moaning from exhaustion, weakened and bruised from great exertion, she is borne away from the arena of her anguish, to recover if she may.

*Now.*—The scene since the discovery of anæsthesia is vastly different. A calmness pervades her being. A few breaths of vapor while in her bed, in the privacy of her own room, and all is forgotten before she is borne to the scene of her transformation. Her demeanor as of a gentle sleep; her repose as of the tired child. At his leisure, with no hurry, no hesitancy, no needed force of brawny arms, the surgeon carefully with concentrated thought, cooly prosecutes his task to the minutest detail. Perchance he stops and waits, that he may know or see, if this way or that is the best, the safest, or promises to be, all things considered, the surest. All is finished. The grateful vapor is removed. The quiet form is tenderly borne back to its cozy bed, where soon consciousness and thought return. The patient sufferer knows relief has been gained, that doubt is over, and with a pleased and grateful countenance she turns her head to hide the heartfelt tears, and thank her Heavenly Father for his love and mercy in allowing her yet for a while to remain with her loved ones.

"And his name shall be called blessed among all the nations of the earth." Dr. Oliver Wendell Holmes, in his lecture at Harvard University, Nov. 3, 1847, says: "The knife is searching for the disease, the pulleys are dragging back dislocated limbs—nature herself is working out the primal cause which doomed the tenderest of her creatures to the sharpest of her trials, but the fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed forever."

The Surgeons of Europe were loud in their praise and congratulations of the discovery and of the discoverer.

The London *Lancet*, the exponent of British medical thought, said at the time of the discovery: "The discovery of Dr. Morton—more striking to the general than to the scientific mind—will undoubtedly be placed high among the blessings of human knowledge and discovery. That its discoverer should be an American is a high honor to our trans-atlantic brethern; next to the discovery of Franklin, it is the second and greatest contribution of the New World of science, and it is the first great addition to the medical art."

"Dr. Morton deserves—if his discovery stands the test of time—the gratitude and reward of every civilized people and government upon the face of the earth."

Prof. S. D. Gross, said : "If America had contributed nothing more to the stock of human happiness than Anæsthesia, the world would owe her an everlasting debt of gratitude."

The surgical and suffering world was being revolutionized in 1846. What an inestimable blessing revealed to man! What an ineffable boon presented to suffering thousands for thousands of ages to come! What incomparable delight vouchsafed instead of direst agony! Surely it could not be! Could humanity gain so much! No wonder the world breathlessly asked, can it be true? No wonder as breathlessly they awaited for the answer *it is true!*

But rudely was the expectancy and hope dispelled, when the first death during etherization was reported. Without thinking, or investigating, the death was attributed to the ether. Death had come while the patient was inhaling the ether vapors, therefore death resulted from the ether. Who would dare deny the proposition? Could not all men see? Was it not self-evident? Wherefore investigate or spend time trying to prove that which was so patent; that which without inquiry or investigation had proved itself?

I submit with the light of more recent progress in administering narcotic vapors, in the light of recent appliances to regulate the percentage of the narcotic vapors to be inhaled, was it a philosophical deduction?

I say, was it just to attribute death to the ether rather than to the way the anæsthetic was made and administered, and the way the patient was overpowered with the vapor? True, death results by overpowering the patient with ether, or other narcotic vapors, if the administrator allows such results: the same as water will drown the infant if the nurse should allow the bathing to do so, by leaving the child *immersed* in the water. Is death due to the water really, or to the negligence of the nurse?

The point is here. Certain natural laws *are* immutable, and certain natural (unchangeable) results (disasters) follow the breaking or disregard of these laws, whether desired or not. Death will result from ether, or from water as well, when these immutable laws are transcended. And it is to call attention to certain laws of physics as applicable to breathing vapors of narcotics, that has instigated me to pen this article.

After a short and undisputed reign of ether, followed the discovery of the anæsthetic properties of the vapor of chloroform in 1847, which from being pleasanter, quicker, attended with less nausea and vomiting, quickly displaced ether as a narcotizer and obtunder of pain, and held supremacy for many years, until from the many deaths *attributable* to this narcotic, and not to the administrator, the pendulum of favoritism swung back again to ether as the narcotic for inhalation. To-day favoritism between ether and chloroform shows a preponderance—a slight preponderance towards chloroform. In speaking of the old or unscientific ways of giving the substances in the cone, on the napkin, or sponge, statistics show that the percentage of deaths resulting from the use of these narcotics, in relative proportion, will be in favor of chloroform.

Then to show the working of these certain laws in relation to individuals and to chloroform or ether or any other similar narcotic, we will observe certain conditions in relation to vapors. To be properly understood allow us to accept the definition presented by a high authority on Anæsthesia, which differs widely from that of lexicographers, yet will give us a foundation for a different idea of anæsthesia than is now entertained and accepted by the vast majority of either physicians or dentists.

The authority referred to is Dr. S. J. Hayes, editor of the DENTAL AND SURGICAL MICROCOSM, whose writings and lectures on the Art and Science of Anæsthesia have given a new impetus to the study and thorough investigations. The appropriate definition given by him (and it is a definition that defines this desirable condition) is that "Anæsthesia is a physical condition in which the force and functions of life are in continuance under modifications, ordinarily by medico-chemical agents, whereby an absence of sensation is induced."

Dunglison says: "Anæsthesia is a privation of sensation, and especially of that of touch; paralysis of sensibility relating to privation of feeling by an anæsthetic agent, one that prevents feeling.'' Any person can readily see why these definitions will not convey an inteligent, comprehensive idea to one's mind when thoroughly investigating the subject of *Anæsthesia*, or the laws of physics as applicable to breathing vapors of narcotics. *Paralysis of sensibility* can be obtained in many ways other than by anæsthesia; *privation of feeling*, can be obtained outside of vapors of narcotics breathed into the lungs and carried with the blood to the sensory centers of the brain. To have an intelligent comprehension of anæsthesia one demands more of a definition and a different resting place to ground and root his ideas before he is able to comprehend, in the broadest sense, what he desires to produce when he contemplates the production of anæsthsia. If only ''paralysis of sensibility'' or ''privation of feeling,'' why waste time and go to the expense of giving vapors of ether, or chloroform or other suitable narcotics? Why not paralyze by external force —a blow, and call the blow an anæsthetic? The result—paralysis or privation of feeling—anæsthesia?

The definition of an anæsthetic by the authority referred to, is, Pure air narcotised by gradation as breathed into the lungs, which alllows the forces and functions of life to be continued under modification, whereby an absence of sensation is induced. Thus, with this definition to start from, we readily have something to seek for.

First.—Pure air narcotised. The air should be pure, as it is the great life-giving element both in and out of anæsthesia. Having abundance of pure air to be breathed into the lungs with each inhalation, there can be no asphixia, no syncope, neither nausea, vomiting, shock, nor concussion and revulsion.

Second.—Impregnated with suitable narcotic vapor to the proper percentage the respired air induces the absence of sensation, or anæsthesia.

Third.—By gradation. Knowing the absorbing and carrying capacity of the air at certain temperatures, and the possibility of overpowering the patient, or paralyzing the sensory nerve centers—by sudden inhalations of large volumes of narcotic vapors. It is of the first importance to induce anæsthesia at first by the smallest percentage of the narcotic vapor in the respired air, say about one per cent., and by gradual gradation or increase place the nerve centers in a state of acceptance, so that there will be no concussion in the neural current, thus destroying the liability to death.

Indeed, I may say now that death should not be a result of anæsthesia.

Gradation then means a starting of the anæsthesia by inhaling one per cent of the narcotic vapor and ninety-nine per cent pure air, with a gradual increase of the narcotic vapor, say at every second inhalation, of one-half to one per cent. Thus continuing the increase of the narcotic up to and not beyond sixteen per cent of the air breathed.

Fourth.—The absence of sensation is not anæsthesia, unless the forces and functions of life are in continuance. One may from many agencies get absence of sensation, but other than the definition, you get asphyxia, shock, concussion; or syncope. One may faint from a sudden action of the mind from any cause, or one may be asphyxiated by immersion in water, or by breathing nitrous oxide, carbonic acid, nitrogen or hydrogen gases, thereby becoming unconscious to pain or external impressions, and still be resuscitated, but the primal condition for true anæsthesia is wanting, viz: plenty of pure air or free oxygen.

Thus, then we come to the broad proposition that anæsthesia cannot be induced or maintained without a continual accompliment of pure air. Just here again, the paradox—that the same air is not the same air at different temperatures. This is especially so when applied to anæsthetics. The absorbing and carrying capacity of the air at different temperatures vary greatly, and herein, I opine, is the great important fact that adds so many deaths to the score of ether and chloroform.

The fact remains, and should be taught, and learned by all persons contemplating using any narcotic for anæsthetic purposes, that the carrying capacity of the air for the vapors of either chloroform, ether, alcohol, chloroform and ether combined, or any other narcotic vapor is twice as great at 60°F., as at 40°F.; and four times as great at 90°F. as it is at 94°F. Statistics sadly explain these facts by the greater number of deaths attributable to chloroform and ether, occurring during hot weather, and at the first stages of the inhalation. How easy to overpower a patient in hot weather in a superheated atmosphere carrying vast volumes of narcotic vapor, and taken into the lungs with each inhalation, thence to the nerve centers, paralyzing the medulla oblongata and producing death, and then wonder *why* the patient died so quickly. Such then are the conditions of the vapors to produce anæsthesia.

The air, be it remembered, is always an element that has to be reckoned as the chief factor in all anæsthesias, and the percentage of the narcotic contained in the air, is an element to be closely considered at each breath inhaled by the patient. Therefore, the air, and the varying percentage of the narcotlc, constitutes a true anæsthetic.

Vapors and gases can by their properties, be received into the lungs and enter by their power of penetrability, into the blood—yet only one of all the gases has the power to sustain life and support combustion in the animal organization. Oxygen in proper proportion in a state of *mechanical* mixture with nitrogen does this, and in no other way or condition. Thus oxygen in any chemical combination ceases to be oxygen. Nitrous oxide truly is composed of oxygen and nitrogen, but as a chemical compound it possesses no property of either oxygen or nitrogen.

Respired, it pervades the blood and is carried by the corpucles to all the tissues of the body; each atom replacing an atom of oxygen. Hence to produce absence of pain by inhalation of nitrous oxide gas, you have to asphyxiate your patient by excluding every atom of free oxygen. That you do gain unconscionsness by asphyxiation with nitrous oxide gas as surely as you do by drowning is manifest by the blueness and purpleness of countenance, due to deoxidation of the blood.

All gases and vapors are capable of entering the blood through inspiration and respiration, but all alike, save one, are deleterious to the organism.

While all gases, if respired, enter the blood and effect the tissues, there are varying degrees of deleterious effects derived from their inhalation and absorption.

All gases become less asphyxiating when breathed as they contain increasing per centage of pure air; or quite a self-evident proposition that the more pure air and less deleterious gases inhaled, the less dangerous results follow.

Some gases may be inhaled to the exclusion of pure air and produce unconsciousness and insensibility to pain by deoxidizing the blood. When so inhaled the results, either immediate or remote, are bad, varying with the nerve resistance and recuperative power of patient. The truth of this is manifest in the fact that we have death immediate or remote, insanity, epilepsy, phthisis, cardiac and Bright's diseases; so that I claim with Richardson of

London: "The use of nitrous oxide gas, for the pretended purpose of producing anæsthsia, should be prohibited by law."

It is no unusual experiment to take animals and birds in physialogical laboratories and produce asphyxia or death just as soon with nitrous oxide gas, as with nitrogen, hydrogen, olifiant, or carbonic acid gases.

The asphyxiated always have rigidity of the muscles. Proper anæsthesia produces relaxation, and if at any stage of anæsthesia, you have rigidity of any muscles, it will denote a partial asphyxia or a manifestation that more free air is needed by the organism. So we again revert to the definition of anæsthesia as a condition in which the forces and functions of life are continued under modification, whereby an absence of sensation is induced. Consequently, no matter what the narcotic element may be, we must have a sufficient quantity of free oxygen. A true anæsthetic should not produce any irritation of the epiglottis, bronchial tubes or pulmonary membranes. The feeling of suffocation, strangling and coughing indicate that the narcotic vapors are too intense or strong, and not enough pure air.

## HYPNOTISM, OR ANÆSTHESIA IN DENTISTRY

### BY MIND ACTING UPON MIND THROUGH THE AGENCY OF ELECTRICITY. ITS USE MAY SOON BECOME GENERAL.

Recent successful experiments made before medical and dental societies in the application of hypnotism to dentistry have served to call public attention to an agency more or less known to physicians as of great service in the relief of pain, and in the curing of disease, says the Boston *Transcript*. Its use in dentistry, however, has been very restricted, and, it is believed, in Boston at least confined to one practitioner. The ease with which it is induced, its harmlessness, and its perfect adaptation to the uses of dentistry give promise that the day is not far distant when it will be in general practice. It is not found essential in its application to dentistry to produce a deep hypnotic sleep known as "lethargy," the second or "profound" sleep having been found sufficient. No special skill is required in influencing the majority of people, and it is believed that every one has the power in some degree. Some have not enough of the faculty to amount to anything practically, while others have great ability that way. Between these are all degrees of skill, according to nature and education. Success in hypnotism is probably as well assured as is success in the general practice of medicine. There is nothing occult or strange about it, and nothing for any one to fear.

Much, of course, depends upon the patient. Some hypnotize readily and deeply, while there are others who are not affected enough to make it noticeable. Good authorities say that an ordinary operator will hypnotize 70 per cent of all his patients. An operator who is especially experienced, careful and persistent, will attain 80 per cent, while exceptional natural ability and cultivation may obtain good results in as many as 90 per cent of his subjects. "Hypnotism," a medical authority on the subject has said, "has passed the stage of experiment and is no longer under the ban of charlatanism, but is considered as one of the most useful remedial agents at our command. And no physician can be considered truly progressive who refuses to inquire into the subject, and admit the possibilities of its usefulness; and he who does not use it is missing the means of curing maladies that nothing else will heal." Dr. John Elliotson used it in his practice in London in 1837. Dr. James Esdaile in 1845 had in Calcutta made a record of 100 cases of anæsthesia for surgical operations when the English government placed him in charge of a hospital, and in 1851 he had completed a record of 261 cases of complete insensibility to pain in severe surgical operations by the use of hypnotism. In 1843 Dr. Joly of London amputated an arm painlessly by means of hypnotic suggestion, and the great Liston made use of it successfully, and Velpeau and Broca reported that they had employed hypnotism satisfactorily in twenty-four operations.

In a late number of the *Dental Review*, of Chicago, appears an article on "Hypnotism as Applied to Dentistry," by Dr. Thomas Fillebrown, D.M.D., of this city, in which he gives the results of many interesting experiments made by him in the application of hypnotism in his own practice. For many years he has been known as an earnest and intelligent investigator of hypnotism, and in the article referred to he says that for a quarter of a century he has "been hoping that the principles as now developed might be applied so as to bring relief to patients during dental operations." Continuing, he says: "It is with pleasure that I am able to-day to report a pronounced success in that direction—a success that I believe will continue, and the methods will be so formulated that the art will be within the reach of every intelligent operator on the human teeth.'' He found that it was the opinion of writers on hypnotism that pain would always wake a patient from the hypnotic sleep unless such patient was in a somnambulistic condition. ''I felt it might be quite possible,'' he says, ''to derive distinct benefit in the lighter stages if they could be kept continuous. I soon believed it possible, and, after a diligent study of Bernheim, I commenced to hynotize, and my first effort proved a success.''

He thus describes his first experience and the result: ''Early in March I felt equal to a trial for anæsthetizing dentine for excavating and then made the discovery that continuous suggestion makes it possible to keep a patient hypnotized, and the dentine wholly or partially anæsthetized, for a full preparation of a cavity during the light sleep of the first and second degree. I am not aware that this has ever been made successful before.''

The hynosis and the anæsthesia is maintained by a constant repetition of the words: ''Sleep, sleep; you are resting; you are not suffering; you are not dreading it; you do not care for it; sleep, sleep,'' and so on continuously so long as the condition is desired. This is practically a continual rehypnotizing to offset the continual waking caused by the cut of the instrument. ''Sometimes,'' he says, ''the hypnosis will wear out in spite of continual suggestion, especially if the operator's attention is too wholly absorbed in the operation and his suggestions become weak. In such a case I stop and hypnotize again. I have hypnotized as many as six times at one sitting. If the sitting is long and the hypnosis deep, the patient is likely to get tired, and I have found it better to wake them up at intervals for rest,or suggest a ready change of position, but the waking is much better. By making this conservative use of hypnotism the patient in every instance, will feel rested and stronger at the close of the sitting than before; and will improve in courage and quiet as the sittings succeed each other, and in many cases the need of hypnosis will cease to exist and the patient will submit to the operation in the wakeful state without shrinking.

Some remarkable examples are given in the article of courage and confidence gained in this way, taken from the author's practice. One was the case of a girl fourteen years old, who had dreaded dental operations so much that for two years she had not been able to have her teeth even cleansed. Hypnotism made cleansing, preparing and filling perfectly easy, and at the fourth sitting she became so indifferent that she was quite willing to have a large cavity in a molar prepared and filled while fully awake.

The results of twenty-one consecutive strictly dental cases that were treated are described. Only one person out of that number failed to hypnotize. In all the other cases it was proved that the dentine was very sensitive. Hypnotism was applied thirty-eight times to twenty patiens. Full anæsthesia of the dentine attained twenty-one times to eight patients, or 40 per cent. of the patients. Anæthesia was not quite complete but practically successful twelve times for seven patients, or 35 per cent. of the patients. In every case there was almost complete, and in most cases entire relaxation of nervous and muscular tension, so that the patient rested during the operation instead of being exhausted. "Almost every patient," he says, "left my operating chair saying they felt better than when they sat down. I always suggest that the patient is resting, will wake refreshed, will be undisturbed, and this result uniformly follows. If by any chance a different result obtains I at once hypnotize again and correct the error. This has occurred in a few instances, but thus far I have not failed to relieve the discomfort. Another distinct gain has been described by several patients independently—viz., when any pain is felt it is sensed only at the point of contact with the instrument, and not over the whole system, as is commonly the case. If a tooth is extracted there is no dread before the operation nor shock produced by it, only a little twinge felt the instant the tooth is pulled."

In a difficult operation for necrosis performed, the nervous system of the patient was much broken down. Any excitement from sorrow, fear or joy would invariably cause her several hours of nervous excitement and distress, entirely disabling her at the time. The hypnosis prevented any unfavorable results from the operation.

At the last meeting of the New England Dental Society one of Dr. Fillebrown's patients was present and consented to be hypnotized as an object lesson in the practice. The patient was put to sleep in less than a minute and the doctor performed a dental cutting in the presence of a large number of dentists, without the slightest manifestation of feeling on the part ot the subject.

*Chicago Dental News.*

# THE PHILOSOPHY OF THE HOMŒOPATHIC LAW OF CURE, AND THE ADVANTAGE TO THE DENTIST OF A CORRECT KNOWLEDGE OF ITS APPLICATION.

BY CHARLES H. TAFT, D.M.D., CAMBRIDGE, MASS.

(Continued from last issue,)

To illustrate this second law: We know that small doses of rhubarb and calomel sometimes allay irritation of the bowels and cure diarrhœa and dysentery, while large doses produce precisely opposite effects. Again, small doses of ipecac and tartar emetic, may be given for their curative action in cases of disordered stomach with vomiting, etc., while large doses of the same medicines, bring about these same abnormal conditions. Small doses of cinchona, may cure chills and fever, while large doses produce the same conditions; and so on, in countless similar ways, do we see the action of drugs, operating for good or evil when administered in sickness or in health, in accordance with well-established laws.

How simple, then, and easy of comprehension is, the homœopathic law of cure, and with what force does it commend itself to our reason and intelligence! The difficulty which seems to present itself most strongly to the opponents of homœopathy, is the inability, or rather, perhaps, the unwillingness to recognize that there can be any power or force in anything not plainly presented to our bodily senses, and in what may honestly appear to them to be contrary to ordinary common sense, and so rather than helping by patient investigation and study to add to the sum of human knowledge and human happiness, so far as their desire of arriving at any purely scientific system of medicine is concerned, they are contented to stand aside, and make general assertions and denials, which, being expressions of opinion only, have no scientific value, and are therefore worthless.

But it is no new thing for truth of any kind to meet with abundant opposition. The reception of the discoveries which followed the invention of the telescope, and the ridicule and condemnation to which Galileo was subjected for the promulgation of his theories as to the laws governing the movement of the heavenly bodies, is only equalled by the same ridicule and opposition which, even in this enlightened age, is meted out with a liberal hand not only upon a now universally recognized system of medicine, but upon all who have the courage to practice medicine in accordance with its teachings. But let the doubter in our own profession, and all others who take exceptions to the truth of the homœopathic law of cure, do as I have done—put the principle of it into every-day practice. I can assure you the results of your work, when once you begin to thoroughly understand your subject, will surprise and astonish you. Lest a man may not have sufficient faith in the efficacy of the higher potencies, I would advise him to first begin with the lower ones, discarding them as his success and familiarity with them lead him to a greater and more satisfactory success with the higher ones.

We come now to the second part of our subject, and I can, perhaps, best illustrate the method of applying the homœopathic law by citing a few cases in practice.

Suppose, for example, a patient presents himself suffering with severe pain in the teeth or face, the result, it may be, of an exposed pulp, an inflammation of the pericementum, a gathering abscess, or the result of other causes producing an annoying train of symptoms. Our first aim is to select the proper remedy which will afford the speediest relief, and in order to make the right selection we must first compare the symptoms of the patient with the remedies which apply to them, and then compare the medicines selected with the symptoms in question.

It is my practice to take careful note of every symptom, writing them down if necessary, getting, so to speak, a pen-picture of the case. Among the various symptoms one may readily recognize one or more key-note symptoms, which instantly suggest a given remedy. It may happen that not all of the symptoms of your patient, will be found under the drug which seems to be the indicated one, in which case it will be necessary to turn to other drugs and compare the symptoms as laid down under those remedies. But it must so happen that all, or at least the greater part, must be found under the drug selected, in order to give the desired relief or to effect a permanent cure; and when such a selection is made you give the medicine to your patient with the utmost confidence and assurance that it will produce the desired result. There is no guess-work nor humbug about it, and your patient will not be likely to attribute the curative action of the medicine to his imagination, or be so ungenerous as to say that relief would have come at just that time without the medicine.

To make my meaning still clearer, permit me to illustrate by one or two cases in practice:

On February 8, 1892, Miss W. came to my office with a large corono-distal cavity in the right inferior second bicuspid. Careful excavating failed to avoid an exposure of the pulp, which was carefully treated, and capped by applying oil of cloves, and dusting a thin layer of the dry oxide of zinc directly over it, then filling the cavity with oxyphosphate, avoiding all pressure. This, I may say in passing, was a case which, when treated in this manner, rarely gives my patients any further trouble. But this one proved an exception to the general rule. The patient began to suffer almost immediate discomfort, which grew worse from day to day, and continued with almost uninterrupted pain for nearly three weeks. The patient was as unwilling to have the pulp destroyed, as I was to suggest its being done as a *dernier resort*, and temporary relief was afforded from day to day with capsicum plasters until they were without further efficacy. On February 27 she came to my office almost frantic with pain, and saying she could bear it no longer. The following symptoms were present: Great soreness and lameness of the tooth; soreness of the gums; pains extending into the upper teeth and round to the wisdom tooth on the left side. Aggravated in the cold air and by hot and cold things taken into the mouth; worse after eating and in the early part of the evening and night; relieved by hot external applications; great dullness and tired feeling in the eyes.

Turning to the repertory, we find the following remedies for—

1. Soreness and lameness of the teeth: Arsenicum, belladonna, bryonia, causticum, mercurius, nux vomica, sulphur.

2. Soreness of the gums: Bryonia, carbo vegetabilis, graphites, mercurius, natrum muriaticum, rhus, pulsatilla.

3. Pains extending to upper teeth: Nux vomica, sulphur, rhus tox., hyoscyamus, lachesis, mercurius.

4. Worse in cold air: Hyoscyamus, belladonna, mercurius, calcarea carb., staphisagria, sulphur.

5. Hot and cold things in the mouth: Rhus, bryonia, calcarea, nux, pulsatilla, staphisagria, sulphur, mercurius.

6. Worse in early part of the evening: Bryonia, chamomilla, natrum muriaticum, rhus, sulphur.

7. Relief from hot applications: Arsenicum, belladonna, cal-

carea, hyoscyamus, chamomilla, lachesis, mercurius, nux vom., pulsatilla, rhus, staphisagria, sulphur.

8. Dullness of eyes: Arsenicum, belladonna, bryonia, hyoscyamus, mercurius, nitric acid.

After striking out all the remedies which occur only once or twice, we find that arsenicum appears three times; natrum muriaticum, four times; pulsatilla, three times; staphisagria, four times; hyoscyamus, four times; belladonna, five times; nux vomica, five times; rhus, five times; bryonia, six times; sulphur, seven times; mercurius, eight times.

If we now examine the symptoms in the materia medica under mercurius and sulphur, we shall find that these will be the indicated remedies, and we give the preference to mercurius, as that more nearly reaches the totality of all the symptoms.

This remedy was, therefore, given in the above case in the two-hundredth potency, with absolute confidence that it would quickly give the desired relief. I neither saw nor heard from the patient for a month, when I received a letter, stating that "the medicine had served its purpose well, that the tooth had given her no further discomfort, and that she felt she should have no further trouble with it, and was furthermore heartily glad that the pulp had not been destroyed."

Frequently a patient presents himself, complaining of severe pain in a tooth, which, we have reason to suspect, may be abscessed, although the process of suppuration has not become sufficiently advanced to cause any lameness or soreness, either in the tooth or peridental membrane. It may happen that the tooth has a large filling, and from the appearance we may expect the pulp has died beneath the filling, but we do not wish to remove it only to find possibly a live pulp. No fistulous opening exists; the teeth and tissues about the affected region all present a healthy appearance, and the fillings are all in good order. The patient, nevertheless, is suffering violent pain, which demands immediate relief. What is to be done in such a case?

My own practice would be such as was adopted in the case of Mr. S., a student at Harvard, who came to my office on May 3, complaining of severe pain in the left inferior first molar with the following symptoms: Pain commenced the previous afternoon, growing worse towards evening, and kept him awake nearly all night. No pain nor soreness in the tooth itself or gums, but a dull, steady ache, starting in that tooth, and radiating through the bones of the face and up into the temple. Aggravated by hot things and after eating; also worse in the warm room. Cold water held in the mouth gave relief, but only temporarily; also relieved by being out in the open air. Could eat on that side with perfect comfort. Patient remarked that the tooth (the sixth-year molar, bear in mind) was dead and had been previously treated. His symptoms, it seemed to me, pointed strongly to bryonia, which was accordingly given in the divided dose,—this is to say, dissolved in water, one tablespoonful every half-hour until relieved. He came back in two or three hours, reporting no relief whatever.

Knowing, therefore, that I had not selected the right remedy, I made the case the subject of still further study. Noticing a large amalgam filling in the crown of the twelfth-year molar back of it, and suspecting a gathering abscess at its root, although there was no soreness in the tooth whatever, and nothing to indicate any possible cause of the trouble except the filling, I prescribed silica to confirm my diagnosis and to hasten the process of suppuration, saying to the patient that the medicine would in all probability give him speedy relief, and that he would come in to see me the following day with his face considerably swollen. He appeared at my office the following afternoon, reporting entire relief from pain within two hours after he left me the day before, when he went to sleep and slept all night, awakening in the morning to find his face in the swollen condition I had anticipated.

Examination showed at once, that the twelfth-year molar and not the sixth was the offending tooth, which was then at once opened into and treated.

The above are cited as illustrations of the many cases that come up in the daily practice of every dentist, and were it within the limits of the paper, I should be only too happy to give many more to show how easily and quickly all sorts of disturbances of the vital force affecting the oral cavity, which we as dentists are expected to know how to intelligently treat, may be made to yield to the gentle curative action effected by the high potencies of the proper indicated remedies.

It not infrequently happens that a patient, unaccustomed to homœopathic treatment, will express an incredulity and great scepticism as to the power of the innocent-looking medicine.

# BROMETHER NARCOSES.

BY GEORGE RANDORF.

Though discovered in 1827, by Serullas, the anæsthetic action of bromether (ether bromatus, ethylum bromatum, $C^2\ H^5\ Br$) was not known till 1849, when Nunnelly discovered it. In 1876 experiments were conducted by Rabuteau, the results of which clearly demonstrated, the fact that bromether was tolerated by the patients easier than chloroform; that it did not excite the mucous membranes; that it acted quicker, and that it was worked off through the lungs more rapidly. Since then it has been tried more extensively by others, and while the new anæsthetic did not answer the expectation of practitioners in long continued operations, in those of short duration it has been proved to possess decided advantages over chloroform.

"I have taken pains," says Dr. Hodds, in an extensive article on the subject in *Deutsche Monatsschrift fur Zahnheilkunde*, "to collect the statistics from a hundred dentists who have practiced the narcose with bromether during the period of about four years, and through the courtesy of the colleagues I am in possession of the results in 32,000 cases. Out of this great total only two deaths are reported, and these, too, under somewhat doubtful circumstances."

The mask used in administering this anæsthetic, consists of a piece of linen the size of a child's napkin, folded into a cornet shape and closely applied to the mouth and nose. On this the bromether is allowed to come down in drops, so that only about three or four grs. a minute are used. This mask has the advantage that you can have several ready for use, and that linen allows the bromether to evaporate quicker, while the flannel retains it even after twenty-four hours.

The dose for one or two extractions, is about 6 to 8 grs. The total application of 20 grs. in drops in three narcoses, will enable one to extract eighteen roots.

## THE NARCOSE.

As to the time when the narcose can be called complete, and operation may safely begin, Dr. Heinrich Hamecher writes in the *Oester-ung. Vierteljahrs. fur Zahnheilkunde*, as follows:

"Only very recently I have succeeded in arranging my bromether narcoses so that I can really know beforehand when to commence painless operations. I pour about twenty grs. of bromether on a napkin which is folded several times. This I hold before the mouth and nose so that the borders of the napkin, touch closely the face. I instruct the patient to inhale and exhale deeply through the mouth at a somewhat accelerated tempo. From the beginning I keep my hand on the thorax and help along by a strong pressure each exhalation. Soon it is noticeable that the patient slowly, ceases to breathe, when the pressure with the hand must be stronger. After about ten pressures on the thorax a condition is created similar to the apnœa. This moment is sufficient even for larger operations to be carried out. When the patients awake from the narcose, they all assure me that the pressure with the hand has made the respiration easier, and made it, on the whole, much more pleasant.''

### AFTER EFFECTS.

While excitation is similar to that produced by chloroform, and outside of about five per cent., is confined to intemperate and nervous patients, vomiting after the narcose occurs only in about one and one-fourth per cent. of cases; it is oftener after larger doses and concentrated administration. Dr. Hodds reports only one case out of 250 narcoses. Some redness of the face is noticeable after the narcose, which is probably due to a slight hyperemia of the brain. This may linger sometimes for hours or even a day, together with a sense of being unwell, accompanied by headache and nausea, which again should be ascribed to anemia of the brain. For these reasons it is advisable to instruct those narcotised, at the approach of such after effects, to take some tonic like coffee, wine or cognac, or to assume a horizontal position.

Some of the bad after effects are to be accounted for by the fact that either the bromether has not been properly prepared or its administration made similar to that of chloroform, which is especially to be avoided.

### CONCLUSION.

The following resume of the experiments by Dr. Schneider in the use of bromether in dental practice has been since corroborated by a large number of practitioners on both sides of the Atlantic:

1. The rapid appearance of the narcose.
2. Absence of the excitement stage.
3. The good health of the patient after the narcose.

Dr. Witzel indeed differs from this almost universal conclusion, but his experiments have been shown to be defective in some particulars, especially by Dr. Hamecher, who has investigated the matter for himself and given the contrary results in over 3,000 narcoses in favor of bromether, in an extensive essay published in the *Oesterreichish-ungarische Vierteljahrsschrift fur Zahnheilkunde*, and from which we take the following extracts:

"After removing all obstacles to free breathing in the way of corsets, tight clothing, etc., and a satisfactory examination of the condition of the heart, nothing is to be feared from the scientific administration of bromether, no matter whether the patient be in the family way, or mismenstruation occurred. However, I demand that the use of spirituous liquors be avoided before the operation, as the bromether narcose seems to be delayed by what would assist chloroform narcose."

As to the excitement of the sensorium, those awakening from a bromether narcose positively declare they had no dream, and, if any, the dream had nothing to do with the operation. Sexual excitement occurs here as in other anæsthetics. Mostly women seemed to betray the dream to the knowing observer by the motions of the body. In men and grown boys, however, no proof of sexual excitement could be gathered from the motions during the narcose. According to their own freely made statements they had pleasant dreams. In cases of less educated female patients it is therefore advisable to have a witness—possibly a female—who shall remain all through the narcose, and not be dismissed before the patient has left the operating room.

Besides corroborating the above resume of Dr. Schneider, Dr. Hamecher adds the following advantages of bromether:

4. The almost absolute absence of danger on careful administration.

5. The fact that in experiments on animals breathing ceased much earlier than the heart.—*Items of Interest.*

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Dr. Hoffkine of the Pasteur Institute at Paris has lately been demonstrating and explaining in England his method of securing immunity from cholera by protective vaccination. He has now gone to India for the purpose of investigating cholera where it is endemic and further applying his method. He has been furnished every facility by the government for the furtherance of his experiments.

## THE PAN-AMERICAN MEDICAL CONGRESS.

The Preliminary Announcement of the Pan-American Medical Congress, to be held at Washington, D. C., U. S. A., September 5th to 8th inclusive, 1893, is just at hand:

From this announcement it is fair to conclude that this will be the largest gathering of medical men that has ever been convened in this country.

The initiative steps for its organization were taken at the annual meeting of the American Medical Association, in Washington, May 5th, 1891, when Dr. Charles A. L. Read, of Cincinnati, introduced the following:

*Resolved*, That the American Medical Association hereby extends a cordial invitation to the medical profession of the Western Hemisphere to assemble in the United States in an Inter-Continental American Congress.

*Resolved*, That the Committee on Nominations be, and is hereby instructed to nominate one member for each State and Territory, and one each from the Army, Navy and Marine Hospital Service, who shall constitute a committee, which is hereby instructed to effect a permanent organization of the proposed Inter-Continental American Medical Congress, and to determine the time and place at which the same shall be held.

These resolutions were unanimously adopted, and the Nominating Committee at once elected.

After this the Congress of the United States, by joint resolution, authorized the President to invite certain governments to send delegates to the Pan-American Medical Congress. That resolution is as follows:

A joint resolution was unanimously adopted by the Senate, June 3, 1892, concurred in by the House of Representatives, July 14, 1892, and approved July 18, 1892, by which the President was authorized and requested to invite the several governments of the Western Hemisphere to send official delegates to the meeting of the Pan-American Medical Congress, to be held in the city of Washington, September 5th, 6th, 7th and 8th, Anno Domini, 1893.

A series of general regulations and also special regulations and by-laws for the conduct of the Congress were drafted and adopted; these make provision for a very perfect organization.

The following are the constituent countries of the Pan-American Medical Congress: Argentine Republic, Bolivia, Brazil, British North America, British West Indies (including B. Honduras), Chili, Dominican Republic, Honduras (Sp.), Mexico, Paraguay, Peru, Salvador, Republic of Colombia, Republic of Costa Rico, Equador, Guataemala, Hayti, Kingdom of Hawaii, Spanish West Indies, United States, Uruguay, Venezuela, Danish, Dutch and French West Indies.

The Sections of the Congress shall be as follows:

1. General Medicine. 2. General Surgery. 3. Military Medicine and Surgery. 4. Obstetrics. 5. Gynæcology and Abdominal Surgery. 6. Therapeutics. 7. Anatomy. 8. Physiology. 9. Diseases of Children. 10. Pathology. 11. Ophthalmology. 12. Larnyngology and Rhinology. 13. Otology. 14. Dermatology and Syphilography. 15. General Hygiene and Demography. 16. Marine Hygiene and Quarantine. 17. Orthopædic Surgery. 18. Diseases of the Mind and Nervous System. 19. Oral and Dental Surgery. 20. Medical Pedagogics. 21. Medical Jurisprudence. 22. Railway Surgery.

The officers of each section shall consist of Honorary Presidents, who shall be residents of the constituent countries of the Congress; one executive President who shall organize the work of the section, direct its deliberations and deliver an inaugural address at its opening session.

The President of the Congress is Wm. Pepper, M.D., LL.D., of Philadelphia, and seventy-two Vice-Presidents selected from all the countries to be represented. The Secretary General is Chas. A. L. Read, M.D., of Cincinnati; there are nine Assistant Secretaries. The Treasurer is Abraham M. Owen, M.D., of Evansville, Ind.

The executive President for each section has been appointed, also a number of Honorary Presidents and Secretaries.

Section nineteen, Oral and Dental Surgery, has been organized with M. H. Fletcher, M.D., D.D.S., of Cincinnati, Ohio, as its executive President, and the following Honorary Presidents:

Dr. Jose Joaquin Aguirre, Santiago, Chili; Dr. R. R. Andrews, Boston; Dr. George Beers, Montreal, Canada; Dr. S. B. Brown, Fort Wayne, Ind.; Dr. Emegdio Carillo, City of Mexico, Mexico; Dr. Wm. Carr, New York, N. Y.; Dr. B. H. Catching, Atlanta; Dr. Geo. J. Fredericks, New Orleans; Dr. Ricardo Gordon, Matanzas, Cuba; Dr. J. H. Hatch, San Francisco; Dr. A. O. Hunt, Iowa City; Dr. Louis Jack, Philadelphia; Dr. H. J. McKellops, St. Louis; Dr. Francis Peabody, Louisville; Dr. J. C. Storey, Dallas, Texas; Dr. J. Taft, Cincinnati; Dr. J. B. Willmot, Toronto, Canada.

Thirteen Secretaries have been appointed, as follows:

Dr. John S. Marshall, (English-speaking), Chicago, Ill.; Dr. N. Etchepareborda, Tacuari 355, Buenos Ayres, Argentine Republic; Dr. Wilson, La Paz, Bolivia; Dr. Benicio De Sa, Rio De Janerio, U. S. of Brazil; Dr. Luke Teskey, Toronto, Canada; Dr. Guillermo Vargas Paredes, Carrera 7, num. 638, Bogota, Republic of Colombia; Dr. J. Luis Estrada, Guatemala City, Guatemala; Dr. Geo. Herbert, Wailuku Maui, Hawaii; Dr. Rafael Rico, Escuela de Med., City of Mexico, Mexico; Dr. A. Lacayo, Granada, Nicaragua; Dr. Andres G. Weber, Corrales 1, Havana, Cuba; Dr. Angel Guerra, Monte Video, Uruguay; Dr. Ramon Campuzano, (Spanish-speaking), Philadelphia, Pa.

## TO STIMULATE APPETITE.

In a lecture on "Concentrated Food in the Treatment of Pulmonary Consumption" (*Pitts. Med. Rev.*), Dr. Thomas J. Mays says that much can be done to stimulate the appetite. For this purpose he often gives the following:

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| R. | Acid Phosporic Dil.......................... | ½ ounce. |
| | Acid Nitro-Muriatic Dil...................... | ½ ounce. |
| | Acid Sulphuric Aromatic................... | ½ ounce. |
| | Tinct. Ferri Chloridi......................... | ½ ounce. |

M. Sig.: Thirty drops in a half glass of cold, sweetened water during meals.

## CRAZED BY LAUGHING GAS.

Annie Burns was found by the police wandering along the river bank near the foot of Twenty-sixth street about two o'clock this morning. She was almost frozen and was evidently not in her right mind. She was locked up in the Twelfth ward police station, and at the hearing this morning she seemed all right. She said she had gone to a dentist's office yesterday afternoon to have a tooth extracted. She remembered nothing after taking the chair, when laughing gas was administered, until she woke up in the police station this morning. She was discharged.

The above was clipped from the Pittsburg *Press* of January 19, 1893. It is here given as a warning to those who produce unconsciousness with any agency, not to allow the patient to leave the office until perfect consciousness is restored and the patient is in normal physical condition as well as mental.

## NEURALGIAS AND NEURALGIC AFFECTIONS.

At a recent meeting of the Medical College of Vienna, Benedikt read a paper on the above subject, in which he distinguished three kinds of neuralgias: (1) Of the nerve trunks or plexuses; (2) of the nerve roots; (3) of the terminations of the nerves.

In neuralgias of the nerve trunks and plexuses there are not only pains during the attacks, but apart from the attacks there are painful points over the tract of the nerve. In most cases all the nerves which issue from a plexus are more or less affected.

Prognosis of idiopathic affections of the nerve trunks and plexuses is very favorable when the specific treatment is applied from the first. Among the specific medicines, Benedikt mentions in terms of special approbation iodine and subcutaneous injections of phenic acid. The salicylates and antipyrine have a curative effect only when the natural duration of the affection is short. Narcotics should be given as little as possible, as they produce only a deceptive lull. The truly specific modes of treatment are galvanization and punctiform cauterizations. Benedikt compels the eschars following the cauterizations to suppurate for eight or ten days by means of an epispastic application, and never has recourse to more than one cauterization. This treatment is, in his estimation, so efficacious that when it fails one may affirm that there exists in the neighborhood of the nerve a lesion not yet appreciable, or a constitutional disease, and that this is the cause of the neuralgia.

Neuralgias of the nerve-roots are characterized by very intense intermittent pains without *points douloureux*. The nerve is painful to the touch, but this pain is alleviated by pressure. This variety of pain is met with in ataxia and in certain painful tics. These neuralgias at the commencement are unilateral; they denote often an alteration of the spinal meninges, in which case they do not coincide with neuralgias of the nerve trunks and plexuses—while the eccentric idiopathic neuralgias are often associated with peripheral pains or invade the nerve terminations. The unilateral, eccentric, idiopathic neuralgias of the roots have no tendency to follow an ascending course. Galvanization employed against these neuralgias gives no result, while faradization *loco dolenti* exercises a calmative but not curative action. On the other hand, the electric cauterizations over the seat of these neuralgias have a very favor able action. The cauterization must be applied over the roost which contain the sensory fibers of the region affected.

In the neuralgic affections of the nerve terminations (anthralgias, aphalagias) cauterization has also a very satisfactory effect. Faradization and the electro-static douche are very efficacious against migraine. As most patients can not stand the treatment during the attack, it is better to carry it out in the intervals of the pains, beginning with three *seances* per week, then two, then only one; but the treatment must be persevered with a long time, from nine months to a year in many cases.—*Boston Med. and Surg. Jour.*

## DENTIST AND PATIENT.

"If you ever noticed, people who have the weak end of an argument always select a time to enter into debate when their opponents are at a disadvantage. Now, for instance, there is my dentist. He is a man of excellent principle, but he cannot quite reconcile himself to the theory of equality of the sexes.

"He is not one of the kind who has a degraded estimate of woman; oh, no, so far to the contrary, he wants to mount her upon a little pedestal in her own home, and there adore her. He thinks her province is strictly within the domestic circle, that she can do much towards 'influencing' the masculine portion, but when it comes to mingling in the world of business or of politics, she is out of her sphere, and should leave such matters to the sex that is both physically and mentally qualified to cope with such affairs. We have had several discussions upon the subject, but the time he likes best to talk with me about it is when I am in the dentist chair and he is engaged in the occupation of filling my teeth.

"It is then that the favorable moment appears to him for advancing this kind of conversation. So when the delightful (!) dental process is going on, and my mouth is wide open and filled with instruments, he commences on the subject, and, as he has it all his own way, with no interruption, save that of an occasional moan, he waxes eloquent, and of course achieves a complete victory. He usually begins with the question: 'And do you really think the world will be much better when the women all vote?' An inarticulate answer, resembling no human vocalization, is all the response he needs to continue:

"'Well, I don't know; I very much doubt it, although I don't know as I should really object if I thought it would improve matters, but you see if women become politicians, they will lose all the power they now possess over the men; and I believe that women are too sacred to be polluted as they would be by contact with grosser elements. A woman always loses that indescribable charm which makes her so lovely, when she places herself on the same footing with men. She is too sensitive, and it is not intended that she should witness such scenes as she would have to in mingling with the outside world. Then, again, what would become of the homes? I believe firmly in home life, and how shall we have it if the women all go into business?' This is but a sample of the way he begins, and I sit there powerless to speak, and literally at his mercy, while he plies me with these unanswerable(?) questions."—*Cincinnati Commercial-Gazette*.

## NEW WAY OF GIVING ETHER.

The New York *Recorder* says: Dr. Charles McBurney, lecturer on surgery in the College of Physicians and Surgeons, has introduced a new method of administering ether which neutralizes the evil effects of the anæsthetic. The elimination of ether from the blood is a slow process, and persons affected with kidney troubles sometimes remain in an uncomfortable condition for weeks after etherization. In the experiment which Dr. McBurney performed before a number of medical students Saturday, the legs and arms of the patient were tightly bound at the thighs and shoulders so that the circulation of the blood in the members was stopped. When the ether was applied to the mouth and nostrils it saturated only one-third of the system's blood, and the unconsciousness was produced with about one-quarter of the quantity ordinarily required. When the operation was finished the bandages were removed and the untainted blood, which they had confined, rushed back to the heart and throughout the body, producing a reviving effect and almost immediate consciousness. The patient spoke intelligently within three minutes. The small quantity of ether used and the rapidity with which the stupor is dispelled render this method peculiarly adapted to weak or sickly persons.

# THE DENTAL AND SURGICAL MICROCOSM.

A QUARTERLY MAGAZINE.

CONTROLLING EDITOR, - - - - - - - - - - SAMUEL J. HAYES
ASSOCIATE EDITOR, - - - - - - - - - FREDERICK GAERTNER

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## EDITORIAL.

### EXAMINING BOARDS.

Should Examining Boards, under authority of their respective States, have power to grant certificates of qualification to those whom they have ascertained, by thorough examination, to be well and duly qualified to practice dentistry?

Prof. Lewis Jack, D.D.S., in writing upon the power of examining boards, as published in the January number of the *International Dental Journal* of 1893, states his subject: "Should Examining Boards Have Power to Grant Certificates of Qualification to Undergraduates?" In the discussion of which he arduously labors to convince his brethern in the profession of the injustice and evil results, both to the public and dental colleges, as well as to the profession at large. In so doing, while endeavoring to conceal the fact, he most manifestly imputes incompetency to the boards of examiners, and seeks redress of grievances by the bestowal of honors at the hands of their superior professional dignitaries in the dental colleges, endeavoring thereby to influence and secure legislation in the several states—to remove from these boards of examiners the power to grant certificates of qualification and license to practice dentistry, no matter how well qualified the applicant may be, if he be not a graduate.

It does not require any great flight of imagination, nor yet keen perception, to recognize in this attempt to establish an oligarchy in the profession to the detriment of a thorough knowledge of all that pertains to the professional calling, as well as to the good of the public.

The question primarily arises not who *ought to be the better qualified* to examine, but who *are the better qualified* to test the knowledge of the applicants. Upon this point there may be some difference of opinion. But, usually those who are appointed on the examining boards, are recommended by their professional brethren on account of their qualifications and fitness for the position, and are usually men who have acquired a lucrative practice, and made a good reputation by being well qualified to serve the public.

Many of the instructors at dental schools, have never been able to secure a lucrative practice of their own, and are paid mostly *in honor* for the exalted position of an instructor in the dental college. True, there are others in most of the schools who have proven themselves to be worthy of the position they occupy, and are held in their respective positions to give character and tone to their school, yet do comparatively little work and know less of the real qualifications of the applicants for a diploma than would the members of the examining board, after a thorough examination. Though much more likely to be disposed *to favor* the applicant with a diploma who may not be qualified, than would the examiners on the boards.

The most of the schools, are not independent, on account of their financial support, and are anxious to enlarge the attendance and turn out as many graduates as possible, and knowing too, full well, that if an applicant who has attended the required number of terms, is refused the expected diploma, he is likely to curse and damage the school. This temptation does not influence the examining boards. Besides, all know that "you cannot make silken purses out of sows' ears." Dentists are born, as well as educated to be dentists. Dental schools are dental necessities, but terms of attendance at these schools do not make dentists, nor qualify them to be dental practitioners. Yet all who attend any of these dental schools, three or four terms can have a diploma.

The mediocre with scarcely a common school training, is placed alongside of the bright young man of genius with a thorough collegiate education, and is classmate with him throughout the entire course, and shares equally in the coveted honors of the school.

Perhaps, the man of genius and culture is better prepared to practice in his chosen profession at the end of the first year than the mediocre is at the end of the fourth year. Yet, he is held back and compelled to remain in school,on account of the stupidity and lack of previous mental training of his brother, the full four years. Is there any justice in this? Is there any encouragement to the bright men of talent and culture? Can there be any better encouragement and incentive to the student of dentistry to earnest and thorough work than the reward of merit from the hands of unbiased and well qualified boards of examiners, after a thorough, searching examination?

If all dental and medical practitioners were compelled to go before an impartial and thoroughly qualified board of examiners, whose aim would be to test the qualifications in every respect and fitness for the honorous duties of their calling, our dental and medical schools would not only maintain a higher standard of education, nominally by basing it on length of time in attendance, but by thorough and effective teaching by duly qualified and experienced teachers, who are eminently practical and skillful in teaching their respective specialties. Besides, many students acquire a good dental education in a dental office with a proficient instructor; and why should they not? And why should they not have credit for the knowledge and skill thus acquired?

It is certainly very evident that to take away the power to grant certificates of qualification from the examining boards, to any who are not graduates of some dental college that is recognized by the dental college combine, is an advance stride in securing an oligarchy in the profession, greatly to the detriment of a higher standard of education and the best interests of the public. Such legislation would not only perpetuate the syndicate of dental schools already formed, but put into their hands the means of self aggrandisement, a mutual admiration combine, money-making institutions as many of them are now, instead of forcing them to do honest, effectual work by having all, no matter when or how they obtain the requisite knowledge of the art and science of dentistry, pass a rigid examination by a competent board of examiners.

Therefore, we most earnestly contend that examining boards should have the power to grant certificates and licenses to all who pass thorough examinations.

## REVIEW.

### OF DR. W. C. WOOD'S ADDRESS ON ANÆSTHESIA.

(Continued from No. 1, Vol. III.)

Having called attention to the unquestionable fact that the blood-flow, or blood-pressure is entirely due to the neural currents, or nerve force, and that the nerve force is dependent upon the action of the mind upon the great heart of the nervous system—the brain—we now wish to emphasize this fact in reference to some of the fallacies assumed by our learned friend.

Dr. Wood says: "I have found that in the first periods of anæsthesia, the blood-pressure is usually elevated, and that it is usually quite high at a time when the respirations are very shallow and imperfect, and the dark color of the blood shows that it is heavily charged with carbonic acid." In this the Doctor finds a result, a condition suddenly produced without being able to recognize the cause, and points to a supposed accumulation of carbonic acid as not only the cause of the dark colored blood, but intimates that it may have had something to do with producing the high blood pressure. If so, will the Doctor kindly tell us how or in what manner these results could be produced by these agencies? Is it possible for any intelligent person to fail to recognize the indisputable fact that the high degree of blood-pressure, is always due to neural force and not to the presence of carbonic acid in the blood, and that the dark color of the blood is due not to the presence of carbonic acid gas in the blood, but to its deoxidation by overloading or over-charging the atmosphere with the ether, thus depriving of the necessary free oxygen to support combustion and sustain life. The mental excitement and the agony of effort to obtain this all essential element—free oxygen—to sustain life, excites the mind and thus stimulates the neural current and of course increases the action of the heart and its potency in propelling the blood, and thus bring about this high pressure and which accounts also fully for the dark color of the blood. Again, the two deaths referred to by the Doctor as having occured as being caused by syncope, could not have been produced by such cause, as syncope can never be produced by any external agent. It is always produced either by an action of the mind, or by a loss of blood, or lack of nourishment to build up the system.

Again, all the experimental and clinical demonstrations in the

University of Pennsylvania, according to the Doctor's own statements, *only go* to establish the fact that chloroform is a much more potent drug, in its chemical and pathological effects, than is ether. That by crowding on to the patients, and inducting equal quantities of both chloroform and ether separately, to the same patient at different times, or in different patients, these experiments have demonstrated that chloroform will probably kill four or five to one of ether.

But Prof. Wood seems to lose sight of the stubborn fact that neither ether, nor chloroform, *per se*, can possibly be an anæsthetic (though commonly so-called), that in point of fact the anæsthetic must be made, and that it must consist of pure air properly charged with the narcotic, and regulated and controlled in its application so as not to produce, by the sudden induction of an over percentage of the drug, a *shock*, or concussion and revulsion in neural circulation by the chemical action of the powerful drug upon the tens of thousands of nerve filaments, spread out over about 1,400 square feet of surface in an ordinary sized man's lungs by reflex action upon the nerve centers.

Pure narcotized air, or aerated chloroform, or aerated ether may be a true anæsthetic, but chloroform or ether *per se* never. Herein lies the solution to the numerous fatalities attributed to the use of chloroform and ether. A true anæsthetic will *never* kill. But aerated chloroform or aerated ether may also be paralyzing, or asphyxiating agents, and then either of them may kill.

## HYPNOTISM, OR ANÆSTHESIA.

The article on hypnotism, or anæsthesia produced by the force of mind upon mind, through the medium of electricity, in another column of this number, is given here to show its value in securing control of neural circulation, or of mind or spirit force over material force. As in our teachings in the art and science of anæsthesia, we have repeatedly referred to the fact that there are but two agencies which can operate upon, affect and control neural circulation, thereby affecting the functions of the vital organs—the heart and the lungs—and consequently life itself; that these are, first, the mind, which is the internal agent; and, second, chemical or mechanical, which is the external agent; that these two agencies may be brought to bear upon nervous force and neural circulation, either *separately* or in combination. If these two agencies be brought to bear at the same time upon the same subjects, the hypnotism or anæsthesia will be obtained much more speedily and effectually.

A hypnotic is properly defined as an agent that has a tendency to produce sleep. Thus one mind operating upon another mind so as to produce somnambulism, or sleep, may be said properly to be a hypnotic, or any suitable narcotic operating upon the nerve centers, so as to produce a similar condition of sleep, may be properly called a hypnotic. Hence, it is truly a wonderful aid, and requires great skill to be able to bring to bear simultaneously these two agencies upon the great nerve centers to secure, in the shortest time, with the least immunity to danger, so as to obtain absence of sensation, hypnotism or anæsthesia. While there are but a few minds possessing such potency and skill in operating upon other susceptible minds, that hypnotism or anæsthesia can readily be produced to that extent that any surgical operation can be performed, yet, all minds can exert to a lesser or greater degree a similar force upon others, which should at all times be brought into requisition in any attempt to produce anæsthesia. A great field of study is opening up to the progressive mind in this wonderful art and science, and it is high time that schools be established for this profound study.

## REMARKABLE SURGICAL OPERATION.

Dr. Sutton, assisted by Drs. Stone, McGrew and Bomgardner, in the presence of many other physicians at the Allegheny Hospital of Allegheny, Pa., on the 26th of March, removed an ovarian tumor from a delicate woman, which weighed 120 pounds, while the weight of the woman after the tumor was removed was only 75 pounds. The lady was 47 years of age and was a private patient in the hospital and for that reason her name is withheld.

When all was in readiness the patient was wheeled into the room and quickly placed on the table. Over the tumor and about that line around the body the measurement was 5 feet 5 inches and over the tumor alone the measurement was 36 inches.

Dr. Sutton stood ready as Dr. McGrew administered the anæsthetic, which was chloroform, instead of ether, as being more favorably adapted because less is required than of ether. The anæsthetic performed its work rapidly and then Dr. Sutton, assisted by Drs. Stone and Bomgardner, began the operation. The incision was made in a second and it was soon found that the tumor was adherent to everything. The work was being performed with all possible haste, while the most careful watch was maintained over the patient. Contrary to expectation she held her advantage and at 3:45, when the operation was completed, her condition was really better than had been anticipated. She recovered quickly from the effects of the anæsthetic and was fully conscious before being placed in bed.

The tumor was of four years' growth and during the last two years extended almost as rapidly as a mushroom. For several months she has not been able to stand and could lie down only with exceeding discomfort and severe suffering.

The operation was more than ordinarily interesting, because of the great size of the tumor, the patient's very low vitality at the time and for weeks previously and the quick and unlooked-for rally from the shock. At night her condition was regarded as very good, and while it is yet too soon to claim a successful issue the surgeons in charge have strong hopes.

This is the largest ovarian tumor ever taken from a living subject. It is probably nearly twice as large as the majority of ovarian tumors removed from living subjects. The only tumor of this kind ever removed that approaches this one in size, was taken from a dead body in the Edinburgh infirmary and weighed 112 pounds.

Since the above was set in type the lady, Mrs. Brush, died about 36 hours after the operation.

## DEATH CAUSED BY ETHER.

Col. Elliott F. Shepard, editor of the *Mail and Express*, and son-in-law of Wm. H. Vanderbilt, died suddenly after taking two or three inhalations of ether at the hands of Dr. Charles McBurney in the presence of the family physician, Dr. J. W. McClain, on the 24th of March, 1893. It is quite probable that the death resulted from the ruthless manner of introducing the supposed anæsthetic. Two or three inhalations of a true anæsthetic, will never cause death. But when the atmosphere is overloaded with the narcotic and thus suddenly introduced into the lungs, it is not a true anæsthetic, but may be a paralyzing agent, as this seems to have been in the hands of Dr. McBurney. The chemical and pathological effect of this sudden induction of an over percentage of the drug evidently produced temporary paralysis, from which there seems to have been a partial restoration by the application of stimulants, and artificial respiration carried on and extended by the administration of oxygen; but from which it seems to have been impossible to fully restore. Had the Doctor generated and applied the anæsthetic by what is known as Hayes' Process of Anæsthesia, with the Hayes' Apparatus, Col. Shephard might still be living. A true anæsthetic never kills, but a paralyzing agent, or an asphyxiating agent may kill. It is only necessary to remind again that neither ether, nor chloroform, nor any other similar narcotic *per se*, can be an anæsthetic. The anæsthetic must *be made* as administered and must always have enough air to sustain life.

To farm out toilet and water privileges to sharks to fleece the unsuspecting public who are expected to visit the World's Fair, is too contemptibly mean and little to have been anticipated of the Directorship of a great World's Fair, or of our grand Republic. It is simply humiliating to an American citizen. Far better abandon the enterprise than to resort to such undignified methods of obtaining money to sustain it.

## DEATH FROM NITROUS OXIDE.

### THE VERDICT.

MRS. MARGARET MOHAN
vs.
DR. W. S. YATES.
} No. 675, FEBRUARY TERM, 1893.

On January 16th and 17th, 1893, the above case was tried in the Common Pleas Court of Allegheny County, Pa. and a verdict rendered for the plaintiff in the sum of $2,500.

The facts in the case, as appeared from the testimony given by the witnesses at the trial, were that Bernard Mohan, the husband of Mrs. Margaret Mohan, the plaintiff, had gone to the office of Dr. Yates to have some teeth extracted, having suffered for some days with a severe tooth-ache. The first day that Mr. Mohan went to Dr. Yates' office he was placed in the chair, and put under the inffuence of what the Doctor called "Vitalized air," but he struggled so violently whilst under the influence of this "Vitalized air" or nitrous oxide gas, that the Doctor was unable to hold him, and told him to come back the next day and bring several friends along to hold him. On the following day Mr. Mohan came with three friends, and was again placed in the chair and put under the influence of the gas. The three friends of Mohan held him, but being a large, powerful man—a mill worker—it was all they could do to hold him, after he was put under the influence of the gas, and the Doctor was unable to get all of the tooth out.

One witness testified that Mohan's face became a purplish or bluish color, similar to a man who has become drowned or partially drowned before he is resuscitated. Mohan after reviving suggested that the gas be administered to him again, and the remaining piece of tooth taken out, and a few minutes after the first administration of the nitrous oxide gas, (probably five or six minutes) he administered it a second time, and took out the remaining piece of the tooth; but the patient had ceased to breathe and in a short time was dead. The witnesses testified that Dr. Yates only had a small quantity of ammonia, which he used and had no other restoratives present, and that Dr. Yates told them that he had no battery, and sent one of them for a battery, also sent his office boy to the nearest drug store for ammonia or other restoratives. Physicians were sent for, who worked with Mohan for about an hour, applying a battery and other restoratives which they brought with them, but without effect, as Mohan was evidently dead. The testimony of Dr. Yates showed that the mixture which he administered to Mohan, was nitrous oxide gas, with a few drops of chloroform added to it.

A large number of experts were called on behalf of the defendant and a few by the plaintiff. The jury rendered a verdict of $2,500 in favor of the widow. The defendant made a motion for a new trial which has been argued but not yet disposed of by the court.

The expert testimony sustained the fact that nitrous oxide gas only produces axphyxia and not anæthesia, and that asphyxia is but the first stage of death, the evidence of which is purpleness and blueness of the countenance as in drowning and is always a warning of death.

## SPACE RE-SIGNED.

THE Hayes Dental and Surgical Manufacturing Company have re-signed the space assigned them for exhibit at the World's Columbian Exposition, for the reason mainly, that those in authority have placed unwarrantable and unwise restrictions upon some of their exhibits. The most important exhibit designed, was that of "Hayes' Process of, and Apparatus for Generating and Applying Anæsthetics." In this they would not allow demonstrations in the use of the same.

What advantage can there be in exhibiting a mechanism without showing its utility and advantages, its superiority over any and verything else designed for the same purpose.

What benefit will a manufacturer of a corn sheller, a reaper, or a sewing machine, derive from an exhibit if he be not allowed to demonstrate its usefulness and superior qualities. But manufacturers of other mechanisms are allowed by the same authorities to demonstrate the utility and superior qualities of their merchandise. Is there anything of more importance to humanity than life and the means and instrumentalities of saving life? Is there anything of greater importance to the medical and dental professions than the art and science of anæsthesia, or hypnotism and the appliances in reference thereto? Yet, that which is of more importance than anything else connected with the World's Fair, cannot be allowed a demonstration in connection with the exhibit of the appliances in the Manufactures and Arts Building. This very unreasonable attitude assumed evidently has been brought about by influences and considerations most unjustifiable and degrading to the honor of a great nation's World's Fair.

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E. T. RIGBY, D. D. S., Davenport, Ia., says, in a letter just received as we are going to press, in reference to Hayes' Process of Anæsthesia: "I am fully satisfied that your mode of administering anæsthetics, is the only *truly safe* method, and that you will yet revolutionize entirely this department of surgery. There is no doubt in my mind but that Col. Shepard would not have died, as he did, had your system been used in the administration of the anæsthetic given."

## ERRATA.

On page 108, ninth line from bottom should read 40° F., instead of 94° F.

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The editor's order not to put his picture in as a frontispiece came too late.—PRINTER.

## IN MEMORIAN.

Died in Xenia, O., Wednesday, February 15th, Dr. George Watt, aged seventy-two years and eleven months.

During the war he was assistant surgeon in the army, and while there received injuries from which he never wholly recovered. The result of these was a partial paralysis, which remained and increased upon him during his life. During the last three or four years there has been a rapid breaking down of the entire system, and to this general giving way is due his death.

Dr. Watt was widely known throughout the profession, and though he has not been in a condition for several years to render service to the profession, yet his death will produce sadness in the hearts of all those who have ever known him.

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Walter Webb Allport, M. D. D. D. S., of Chicago, died on Tuesday, March 23d, after a severe illness of about five weeks. His affliction was meningitis preceded by erysipelas. At the time of his death, his wife was making a tour of Europe.

In 1858 Dr. Allport was elected president of the Western Dental Society; in 1860 he was elected chairman of the American Dental Association at its organization; in 1865 he was elected President of the American Dental Convention, and in 1886 he was elected President of the American Dental Association. In 1881 Rush Medical College conferred on him the honorary degree of M. D., and for many years he was Emeritus Professor of Dental Surgery in that institution and in the Chicago College of Dental Surgery. He was a member of the dental section in the Ninth International Medical Congress, which met in Washington in 1887, and was made Vice-President of the section. He was one of the organizers of the Chicago Microscopical Society, and for a long while its President. He was largely instrumental in the organization of the American Dental Association. He was also the Editor for two years of the *People's Dental Journal.*

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Died at Middleton, New York, August 12th, 1892, Dr. Edgar Park, in the fifty-second year of his age.

Dr. Park was born in Wainfleet, County of Welland, Ontario, April 21, 1840. Through the influence and association with his uncle, Dr. Park of Chicago, with whom he lived, he became deeply interested in the study of medicine, and attended a regular course at Rush Medical College. Later his attention was directed to the special branch of dentistry, and he adopted it as his profession, entering upon a course of study at the Ohio Dental College in the year 1864, and graduating at the Missouri Dental College in 1869.

He was associated in practice with Dr. W. W. Allport, of Chicago, for a short time, after which he went to St. Louis and took a position as assistant to Dr. C. W. Spalding in 1865. In 1867 he became associated with Dr. H. J. McKellops, and remained with him until 1870 when he opened an office of his own. He soon secured a lucrative practice, and was highly esteemed socially and professionally. In 1873 he was happily married to Mary C. Fisk, an accomplished and lovable woman, daughter of General Clinton B. Fisk.

He continued the practice of his profession until March, 1884, when failing health compelled him to retire, and, after an illness of eight years, died at Middleton New York, August 12, 1892.

His wife and five children (four daughters and one son) are left to mourn the death of a devoted and affectionate husband and father. Dr. Park was devoted to his profession, and was often heard to remark that, "If I were worth a million, I would never give up my practice.

## ESSAYS FOR THE WORLD'S COLUMBIAN DENTAL CONGRESS.

### TO BE HELD IN CHICAGO, 1893.

It is the aim of the World's Columbian Exposition "to gather together evidences of the material progress, achievement and civilization of the world, and so arrange them that every department of human endeavor may be studied and examined through all its various grades of development." In recognition of the important part which the growth and professional development of dental science and art have contributed to the world's progress, the holding of a "World's Columbian Dental Congress" under the auspices of the World's Congress Auxiliary has been provided for by a duly authorized General Executive Committee, appointed by the dental profession of America through its two governing dental organizations. The undersigned committee, being intrusted through authority of the General Executive Committee with the duty of soliciting essays appropriate to the "Division of Dental and Oral Surgery," and realizing the necessity and great importance of a proper presentment of the literary and scientific phases of our profession through the contributions of its representative men, would earnestly and respectfully invite you to contribute a paper directly or collaterally connected with the above named department, and submit it to this committee at least three months previous to the convening of the Congress, the date of which will be August 17, 1893. All essays must be in the hands of the committee at the time requested, in order that opportunity shall be afforded for their arrangement and assignment to appropriate sections. Those contributions earliest received will, of course, take precedence. The appended list of topics has been prepared by the committee on essays, and is offered not as restricting in any degree the range of subjects, but in the hope it may be useful in a suggestive way. The committee specially desires that an early answer to this request shall be forwarded to the chairman, stating whether you will prepare a paper or not. If you accept the invitation, please furnish with your acceptance, if possible, the title of your paper. Forward all communications to the chairman of the Committee on Essays, Lock Box 1615, Philadelphia, Pa.

DR. EDWARD C. KIRK, Chairman, Philadelphia, Pa.
DR. J. W. WASSALL, Chicago, Ill.
DR. A. H. THOMPSON, Topeka, Kas.
DR. H. H. JOHNSON, Atlanta, Ga.
DR. L. G. NOEL, Nashville, Tenn.
DR. C. NEWLIN PEIRCE, Philadelphia, Pa.

### GENERAL TOPICS.

Dental Anatomy and Histology.
Physiology and Histology.
Dental Medicine and Pharmacology.
Chemistry and Metallurgy.
Dental and Oral Surgery.
Dental Therapeutics.
Operative Dentistry.
Mechanical Dentistry and Prosthesis, including Crown and Bridge-Work.
Bacteriology.
Pathology.
Prophylaxis.
Orthodontia.
Ethics.
Dental Education, including Post-Graduate Work.
Instruments and appliances.
Statistics.
Nomenclature and Terminology.
Dental Legislation: its Local, National and International Relations.
Dental Professional Organization for Protective and Educational Ends.
Miscellaneous.

## THE HAYES PROCESS OF ANÆSTHESIA,

For the relief of pain in all dental operations (usually painful), stands peer to everything else. In fact, there is nothing so well adapted to give relief to nervous patients, who are exceedingly sensitive, as the Aerated Hypnotic by the Hayes Process.

It is not necessary to produce profound anæsthesia, or to carry the patient into a state of unconsciousness in order to get absence of sensation. Just a few inhalations, even with the rubber-dam on the teeth, and you can proceed to operate without pain.

We receive many letters urging us to make known more fully the merits of this Process, etc., of which the following, from Dr. Pittwood, is a sample. As we have never had the pleasure of the Doctor's acquaintance, nor yet none of our agents ever saw him, and as this comes to us entirely unsolicited and not as an advertisement or testimonial, but simply to let us know how he is succeeding, it will be of service to the profession who desire information concerning the same, and by permission obtained from the Doctor since receiving it, we publish it herewith:

SPOKANE, WASH., February 19, 1893.

*Dr. S. J. Hayes, Chicago, Ill:*

DEAR DOCTOR—I have worked day and night since receiving my Apparatus, and this is the first opportunity I have had to write to you. I am using the Hypnotic on every patient for filling teeth, and they are all delighted and say that they will not have their teeth filled by any other method so long as I am near.

I have all the people talking about it, and already feel that I will reap a bountiful harvest that I could not receive only through the use of this wonderful Process you have discovered. My patients are very enthusiastic and speak of it in the highest terms. I, myself, am delighted over it. I would advise you to add in your pamphlets an article on filling teeth without pain. A great many dentists will think by reading the Pamphlet that it is good only to extract, and will not go to the expense of purchasing a Right. Had you not assurred me, also others to whom I wrote, that it was the very thing for Sensitive Dentine, I would not have gone to the expense to purchase an Exclusive Right. I have the Hale-Lennox methods and they are no comparison to the Hypnotic. The hot gas produces pain to the teeth, gums and lips, the blast cannot be confined to the cavity, and in using it, I have concluded that there is a good deal of pain produced by the application to save possibly lesser pain, which is that of drilling in the cavity. The Hypnotic in its second stage acts almost wholly upon the sensitive nerves, the motors are not affected, the patients' remarks are, "Isn't it wonderful? I have my consciousness, can move, talk and act, yet, all this drilling does not hurt me." They are simply astonished at the results.

To give my patients confidence, I allow them to hold the Generator telling them that when they feel that they are near the jumping off place to hand it to my assistant. They then take it willingly and have no fear. I will soon have this town worked up over this method. Had nearly a column in the paper, and if I can find it I will clip it out and send it to you. My friends tell me that everybody is talking about it, and that those who have taken it are very pronounced in their praise. Doctor, you have a wonderful discovery and for the benefit of humanity push it, and let the world know it.

I think, I will need another Generator soon, am of the opinion that one will not be sufficient to handle my practice.

Hope some day to have an article for the D. and S. M.

Yours respectfully,

EDWARD PITTWOOD, D.D.S.

*Respectfully submitted,*

HAYES DENTAL & SUGICAL MFG. CO.

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## HAYES DENTAL AND SURGICAL MANUFACTURING CO.

The attention of dentists and physicians, is respectfully invited to the new head-quarters of the Hayes Dental and Surgical Manufacturing Company, in the Schiller Theater Building, Randolph street, near Dearborn, Chicago, where "Hayes Process of and Apparatus for Generating and Applying Anæsthetics" will be found in use and its superior merits denonstrated by Dr. Hayes himself and others, in connection with various surgical operations.

In view of the restrictions attempted by the authorities at the World's Fair, in not allowing demonstrations, we deemed it wise and to our best interest to resign the space assigned and to secure ample space in the elegant Schiller Building to exhibit and fully demonstrate the superior results of this marvelous Process of anæsthesia with "Pure narcotized air;" and now we cordially invite all physicians and dentists to visit our spacious rooms and see the demonstrations.

Here copies of THE DENTAL AND SURGICAL MICROCOSM can also be secured.

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IF you would be "read up" in the art and science of anæsthesia, take THE DENTAL AND SURGICAL MICROCOSM. It is the only journal devoted chiefly to this important art and science.

## A NEW BOOK ON THE ART AND SCIENCE OF ANÆSTHESIA, OR HYPNOTISM,

By the Editor of The Dental and Surgical Microcosm, will shortly make its appearance. It is designed as a text book for the earnest student of science and art, who is not satisfied with simply knowing results, but aspires to know the cause of every result, knowing full well that there is never a result without a cause; never paralysis of nerve center, never asphyxia and never a death without a cause. That knowing the causes of the unpleasant results so frequently obtained, he may be able to remove the cause and obviate these undesirable and lethal effects. In this Book there is an entire departure from the usual prosaic narrative, historical manner of presenting the subject, and instead, the actual practical work of the art and science is presented in such vivid, startling and inspiring thoughts as to enable the student at once to grasp the great fundamental truths and principles which are the bed rocks upon which this profound art and science rests.

Many orders for the book have already been received and will be filled in the order in which they have been received. Others contemplating ordering the book will do well to send their orders at once to Hayes Dental and Surgical Manufacturing Company, stating the character of the binding they wish.

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| Price of | Book in | good | Leather | Binding is.... | $3 00 |
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When the book is ready to be delivered those whose orders have been received will be notified in the order of receiving, and on the reception of the money for the price of the book ordered, the book will be promptly delivered per express, mail, or as otherwise ordered.

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Pental.—With regard to this and other anæsthetics, Prof. Turet, Germany, reports 109,230 administrations, with 39 fatalities; chloroform was administered 94,123 times, with 35 deaths; ether, 8,432 times, with 1 death; ether and chloroform combined, 2,891 times, with 1 death; ether and alcohol, 1,380 times, 1 death; bromo-ethel, 2,179 times, no death; pental, 219 times, 1 death, which will show the average of deaths greater from the use of pental than other anæsthetics.

## TO LICENSEES OF HAYES PROCESS OF ANÆSTHESIA.

We desire to call the attention of the Licensees of "Hayes Process of Anæsthesia, or Hypnotism" to the fact that any failure to get the desired anæsthesia within less than two minutes and in some patients within half a minute is due not to the Hayes Process, nor to the Hypnotic, but to the failure in conducting the anæsthesia, and we would advise such by all means, to take the course at the Post Graduate School of Anæsthesia, and become an expert in the art and science. Once an expert and it will be worth more to you in your professional duties than $1.000, in that it will earn you more than that amount of money. Read up, read the DENTAL AND SURGICAL MICROCOSM, and come prepared to graduate with honor to yourself and class. Remember the School opens May 1st, and that at least one month's attendance is expected in thorough training.

Nothing can be of greater interest and importance to the licensees of Hayes' Process of Anæsthesia, than to take a course at the Post-Graduate School of Anæsthesia, to be opened up first day of May, 1893, in Schiller Theater Building.

Here they will find abundant demonstrations of its superior qualities and results in various surgical operations; such as in excavating sensitive dentine, extraction of teeth, removing pulp and nerves, opening abscesses, etc., and also in gynæcology and all sorts of general surgical operations, in connection with hospital work.

Besides, he who will have taken this course is armed for success and protection in the active duties of his honorable calling. Let none miss this opportunity of taking this course while attending the World's Fair. Aim to be one of the first in the civilized world to take this special course of study and receive the degree of M. A. S. A., (Master of the Art and Science of Anæsthesia.)

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IT has been stated that exhibitors of large capital have been rooting out others of smaller capital by the presentation of considerations to those in authority for the space assigned them in the first place in the World's Fair. If the United States conducts this great enterprise, it will be in order for Congress to appoint an investigating committee.

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WE invite a careful reading of the very excellent article of Dr. J. W. Clyde.

## ITEMS OF INTEREST.

The brain of the late General Butler weighed 62 ounces.

The Atlanta Medical College graduated 75 students this year.

Dr. Alfred Hardy, the great French dermatologist, died recently, aged 82.

Dr. Johannes Von Widenmayer, chief burgo-master of Munich, is dead.

The massive and handsome New Buffalo College was formally opened last week.

During the last fourteen years 1,000,826 persons have died in Bengal, India, from cholera alone.

The Illinois senate committee on state charitable institutions has agreed upon a committee bill making an appropriation of $500,000 to build a hospital for the pauper insane.

Dr. Pettus, in charge of the Buffalo Marine Hospital service has been notified to hold himself in readiness for appointment as special surgeon at Southampton, England.

Dr. Wm. C. Lence, of Jonesborough, Ill., has been chosen to succeed Dr. E. B. Elrod, as superintendent of the Illinois Southern Hospital for the insane, located at Anna, Ill.

The Woman's Medical College of Pennsylvania has advanced the requirements for graduation to four years. All new matriculants must now take four annual courses of lectures.

Samuel Gray, a Scotchman 44 years old has brought suit for $10,000 damages against Drs. Douglas, Field and Fitch of Bellevue hospital, New York, for confining him for 300 days as a lunatic when he was perfectly sane, and got into their clutches through a blunder of the hospital ambulance driver. Gray was arrested for drunkenness and sentenced to ten day's labor on Blackwell Island. Instead of being put in the prison van the day following for transfer to the island, Gray says he was bundled into a Bellevue hospital ambulance with a crazy woman. He was neither in need of medical treatment nor was his mind affected. He protested against his treatment, but to no end.

Ohio College of Dental Surgery has graduated this year (March 15), fifteen of her students.

The Kentucky State Dental Society meets at Richmond, Ky., June 6th.

Illinois State Dental Society and Iowa State Dental Society—

Joint Meeting—The twenty-ninth annual meeting of the Illinois State Dental Society will be held at Rock Island, May 9–12, inclusive. The thirtieth annual meeting of the Iowa State Dental Society will be held at Davenport, May 9–12, inclusive. These cities are located on opposite sides of the Mississippi river and arrangements will be made to hold the meeting jointly.

North Dakota Dental Association.—The eleventh annual meeting will be held at Fargo, N. Dak., in the parlors of the Columbia Hotel, commencing Wednesday, April 12, 1893, at 10 o'clock A. M. Officers: H. L. Starling, president, Fargo; D. B. McLain, vice-President, Jamestown; R. B. Foster, Secretary and Treasurer, Grand Forks.

Twenty-eight graduates of the American College of Dental Surgery—The annual commencement exercises of the college were held in the Grand Opera House Tuesday afternoon. The dean of the school, John S. Marshall, M. D., who was to have presided, was absent, owing to illness. This place was supplied by L. C. Ingersoll, A. M., D. D. S.

The doctorate address was delivered by Rev. O. P. Gifford, D. D., after which the degrees were conferred and the prizes distributed by the chairman. The valedictory address was delivered by George T. Benzet. The graduates were the recipients of floral tributes from their lady colleagues in their class.

The following were the toasts and speakers at the banquet: "The Faculty," Professor L. C. Ingersoll, A. M., D. D. S.; "The World's Columbian Dental Congress," Louis Ottofy, D. D. S.; "The Class of '93," C. F. Brown, D. D. S.; "The Healing Art," W. K. Harrison, M. D.; "The Press," John W. Tindall; "The Class Prophet," F. E. Pilcher, D. D. S.; "The Doctor of Divinity," the Rev. Mr. Bettman; "The Doctor of Law," Mr. H. D. Coughlan; "Our Alma Mater," W. E. Pilcher, D. D. S.

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THROUGH the courtesy and kind permission of Prof. W. C. Barrett, our readers are furnished with a most interesting and very scientific article in this number, on Nervous Force. Don't fail to read it carefully, as it involves basic principles in anæsthesia.

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THE Kansas City Dental College on March 3d, conferred the degree of D.D.S. on four of their students, John H. Hike, Andrew W. Davis, Richard J. Winn and W. W. Dwight.

## THE "POST-GRADUATE SCHOOL OF ANÆSTHESIA"

Will open May 1st, 1893, in Chicago, Ill., in the Schiller Theater Building, with a full corps of Instructors, a Faculty of rare talents for their respective positions and duties.

The chief aim of the School, is to afford a thorough training in "The Art and Science of Anæsthesia;" and no effort will be spared to make it first class in every respect. While the Faculty is not quite complete, yet the character of the members already secured, most of whom have more than a national reputation, is sufficient evidence of the substantial and elevated character of the work contemplated by the School. Fine lecture halls, rooms for general surgical operations, for oral surgery, extraction of teeth, etc., for painless dental operations in Prosthetic Dentistry, all to be conducted in Anæsthesia or Hypnotism, are provided in this new and magnificent building.

The Infirmaries connected therewith, will be free and open for all.

All who contemplate taking this course, should know that a Diploma conferring the degree of M. A. S. A., only on those who shall have passed a rigid examination and given full evidence to the Faculty of a thorough knowledge of the Art and Science of Anæsthesia, will be given, and that all will be required to spend at least one month in the school, under special instructions and training.

The charge for the entire course, including matriculation fee, lectures and Diploma, if found qualified, will be $100.

Many from abroad, will no doubt, take advantage of attending this School and taking the course while attending the Columbian World's Fair. With this in view, the School will arrange to require attendance only half of each and every day.

Those who will read up at home before entering the school, will have less work to do while attending.

All physicians and dentists desiring to take the course, can obtain full particulars and advice by addressing the Secretary, who, on application, will send Prospectus giving all information desired and who will arrange for rooms and boarding on best possible terms to suit the applicants. Address,

Dr. S. J. Hayes, Sec.
Schiller Theatre Building,
Chicago, Ill.

# THE VALUE OF TRIONAL AS AN HYPNOTIC.

Dr. Brie, Bonn. (*Neurologischs Centralblatt*, December 15, 1892.) Trional is described as a powder consisting of tablets of a melting point of 76 degrees C., readily soluble in alcohol and ether, but less soluble in water, requiring 320 parts of water at ordinary temperature. Trional belongs to the same chemical family as sulfonal and tetronal, but containing three ethyl groups instead of two as in sulfonal, and four as in tetronal. Its chemical composition is a diethyl sulfon methylmethan, and was first described by Kast and Baumann. The drug was given in fifteen to twenty-five grain doses, fifteen to forty-five minutes before retiring, and in those cases in which pure insomnia existed, sleep followed in from fifteen minutes to one and one-half hours after administration. Dr. Brie used it chiefly in mental diseases, dividing his cases into four classes. The first class included mild forms of melancholia and hypochondria; eleven cases were under treatment, and in all, seven to nine hours' sleep followed. The second class included four cases of agitated melancholia; these cases had been previously treated with opium, chloral, etc., without any favorable results. The first two cases were given thirty grains of trional with happy effect; the third patient was obliged to take forty grains, and the fourth patient was given fifteen grains.

The third group included the maniacal cases and paretics; ten cases were treated with but one failure, and that because of stomach irritation, necessitating abandonment of the drug. In these cases other hypnotics had been tried, such as chloral, paraldehyd, sulfonal and tetronal, but the results were not as satisfactory.

The fourth class included paranoia and the hallucinations; eight patients were treated and all were successful. Besides these mental diseases—insomnia, due to overwork, worry, excluding pain, trional gave refreshing sleep. Trional differs from sulfonal in that the latter takes effect later and has an accumulative action; from tetronal, in that tetronal takes effect quicker, but the effect wears off sooner.—*Buff. Med. and Surg. Jour.*

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SUBSCRIBE for THE DENTAL AND SURGICAL MICROCOSM. The publishers will supply you with Nos. 1 and 2 of volume 3 at your request.

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A Dental Legislative Association is being formed in Illinois.

## NO CODE.

The New York State Medical Society has adopted the following resolution:

*Resolved*, That the society reserves to itself the right to punish its members for any unprofessional conduct. The determination of what shall be considered unprofessional conduct, shall rest with the society. If at any time charges are preferred against a member of the society, these charges are referred to a committee which already exists for a similar purpose. This rule shall take the place of paragraph eight, chapter six, of the by-laws, as well as the rules adopted by the society in February, 1882.

*Resolved*, That the society deems it unwise at this time to appoint any committee of conference with the American Medical Association upon the subject of medical ethics, as requested by that distinguished body, but the society ventures to express the hope that the American Medical Association, at no distant day, will take such action as will remove the merely technical obstacle to the most cordial co-operation between the two societies.

## WORLD'S FAIR BUREAU.

For information of dentists and physicians who contemplate attending the World's Columbian Exposition and to assist them in securing comfortable quarters—rooms and boarding—such as would be most desirable and at reasonable prices, this Bureau has been established and will be conducted by the "Post-Graduate School of Anæsthesia," absolutely free of charge, excepting $1, designed to cover expense of postage stamps, stationery and registration, etc. Any physician or dentist desiring rooms, boarding or information, by sending $1 for the above, with name and address, rooms, etc. desired, naming the number of persons to be accommodated and what and how desired, etc., can secure the same through this Bureau without charge for service, and all such persons can come directly to the Schiller Theater Building, 13th Floor, and be assigned to comfortable quarters. Address

POST-GRADUATE SCHOOL OF ANÆSTHESIA,
Schiller Theater Building, Chicago, Ill.

AT its recent commencement the Missouri Dental College graduated three of their students, Jas. A. Hulan, Jas. Linton and W. E. Willer.

# THE NEW HOUSE LETTER BOXES.

## HOW MUCH THEY ARE TO ADD TO THE PUBLIC CONVENIENCE.

Two thousand letter boxes a day will be turned out by a factory which begins December 1 to manufacture those articles for the private use of householders all over the Union. They are designed for attachment to the doors of dwellings and other buildings of the patterns selected by the postoffice department from 1,600 models offered. To produce these models cost the inventors of this country not less than $250,000. Half a dozen styles were picked out as the best by Mr. Wanamaker, and the inventor of one of them has bought out the others.

The contrivances are to be introduced in all places where there is free delivery. According to the newest census there are 2,618,267 residences in all the towns of the United States which have more than 10,000 inhabitants. It was recognized from the beginning that, in order to get householders to employ such contrivances, some better inducement must be offered them than the privilege of having their mail dropped in a receptacle at their doors. Citizens generally will not even take the trouble to have slits in their front doors, through which letters may be put. They do not feel interested in saving the postal service time. But the inducement required is supplied in these devices by the introduction of an arrangement which enables every person having a private box to mail his own letters, newspapers and packages without going out of his dwelling. At the same time he can purchase stamps and stamped envelopes in any quantities he desires without leaving his house.

Nothing appears on the outside of the door but a slot and two keyholes. The occupant of the dwelling has his own keys for opening the compartments from within. If he wants to procure stamps or stamped envelopes, he incloses the money for them in an envelope with an order indicating the number and denominations required. He drops this envelope into the collection compartment, addressed to the carrier, who takes it to the postoffice, where the order is filled. On his next trip the carrier delivers the stamps, two 2-cent stamps being retained and canceled for the service.

## WANTS, FOR SALE, ETC.

Our terms for advertising under this head are 5 cents per word. Initials will be charged same as words. Advertisements must be in our hands fifteen days before the first day of the month of publication, to insure insertion in following number. Cash or postage stamps must accompany all advertisements.

HAYES DENTAL & SURGICAL M'F'G CO.,
804 Penn Ave., Pittsburg, Pa.

WANTED—Experienced all-around Dentist, thoroughly competent. Address, Dr. BUNN, care Hayes Dental & Surgical M'f'g Co., Pittsburg, Pa.

WANTED—Thoroughly competent Dentist, in porcelain art, bridge and crown work. Address, DR. WHITE, care Hayes Dental & Surgical M'f'g Co., 804 Penn Ave., Pittsburg, Pa.

WANTED—To buy (cheap) Archer Dental Chair, for extracting. Address, DR. J. PALMER, care Hayes Dental & Surgical M'f'g Co., Chicago, Ill.

WANTED—An Allopathic Physician as partner in practice in Chicago. Must be thoroughly competent, bright, and of good appearance. Address, M. D., care Hayes Dental & Surgical M'f'g Co., Chicago, Ill.

WANTED—A Partner in dental business who is thoroughly competent in prosthetic dentistry, in crown, bridge and porcelain art work. Address, Dr. C., care THE DENTAL AND SURGICAL MICROCOSM, Schiller Theater Building, 13th Floor, Chicago, Ill.

WANTED—To purchase a good second-hand Gynæcological Chair. Address, DR. D., care Hayes Dental & Surgical M'f'g Co., Schiller Theater Building, 13th Floor, Chicago, Ill.

WANTED—To buy complete Dental Outfit, second-hand. Must be in good condition. Address, DENTIST, care THE DENTAL AND SURGICAL MICROCOSM, Schiller Theater Building, 13th Floor, Chicago, Ill.

FOR SALE—In city of 300,000 population, a complete Dental Outfit, Latest Wilkerson Chairs, Fountain Spittoon, etc., and good practice. Cheap, part cash and on time. Address, G. to Hayes Dental and Surgical M'f'g Co., Schiller Theatre Building, Chicago, Ill.

# DIRECTORY OF DENTAL SOCIETIES.

*American Dental Association*—Meets in August, 1893, in Chicago, Ill. Pres., J. D. Patterson, Kansas City, Mo.; Rec. Sec., Geo. H. Cushing, Chicago.

*Southern Dental Association*—Meets at Chicago, Ill., 1893, exact time to be decided later. Pres., B. Holly Smith, Baltimore, Md.; Sec., D. R. Stubblefield, Nashville, Tenn.

## STATE DENTAL SOCIETIES.

*Alabama Dental Association*—Meets annually. Next meeting at Birmingham, on the second Tuesday of April, 1893. Pres., C. L. Byoid, Eufaula; Sec., S. W. Foster, Decatur.

*California State Dental Association*—Next meeting will be held in San Francisco, June 8, 1893. Pres., W. Z. King, San Francisco; Rec. Sec., L. Van Orden, San Francisco; Cor. Sec., C. E. Post, San Francisco.

*Colorado State Dental Society.*—Meets first Tuesday in June, 1893. Pres., J. M. Norman. Denver; Secretary, Sarah May Townsend, Denver. Next meeting will be held at Colorado Springs.

*Connecticut State Dental Society.*—Will hold a union meeting in connection with the Connecticut Valley Dental Society at Hartford, in May, 1893. Pres., E. A. Stebbins, Shelburne Falls; Rec. Sec., Geo. L. Parmele, Hartford.

*Dental Society of the State of Maryland and District of Columbia.*—Meets annually. Next meeting at Washington City, on the second Tuesday in October, 1893. Pres B. F. Coy, of Baltimore; Sec., M. W. Foster, Baltimore.

*Florida State Dental Association*—Meets annually. Next meeting at Gainesville, second Tuesday in May, 1893, Pres. B. B. Smith, Gainesville; Sec., F. E. Buck, Jacksonville.

*Georgia State Dental Society*—Meets second Tuesday in May, 1893, at Atlanta, Ga. Pres., S. M. Roach, Savannah, Ga.; Rec. Sec., S. H. McKee, Talbotton; Cor. Sec., L. D. Carpenter, Atlanta.

*Illinois State Dental Society*—The next meeting will be held at Rock Island, on the second Tuesday in May, 1893. Pres., E. K. Blair, Waverly; Sec., Louis Ottofy, Chicago.

*Indiana State Dental Society*—Meets next at Indianapolis on the last Tuesday of June, 1893. Pres., R. W. Van Valzah, Terre Haute, Ind.; Sec., G. E. Hunt, Indianapolis.

*Iowa State Dental Society.*—Meets annually. Next meeting in Ottumwa on the first Tuesday in May, 1893. Pres., S. E. Hatch, Sioux City; Rec. Sec., G. W. Miller, Des Moines.

*Kentucky State Dental Association.*—Meets annually. Next meeting in Richmond, Ky., in June, 1893. Pres., M. W. Steen, Augusta; Sec., J. H. Baldwin, Louisville.

*Kansas State Dental Association*—Pres., J. A. Roberts, Sabetha; Sec., J. P. Root, Kansas City. Next meeting will be held at Topeka, April 25, 1893.

*Maine Dental Society*—Pres., L. S. Chilcott, Bangor; Sec., C. E. Bryant, Pittsfield. Meets on the third Tuesday in July, 1893, in Portland.

*Maryland State Dental Association*—Next annual meeting will be held on the first Monday in June, 1893, in Baltimore. Pres., Thos. H. Davy, Baltimore; Rec. Sec., W. W. Dunbracco, Baltimore; Cor. Sec., J. E. Scott, Baltimore.

*Massachusetts Dental Society*—Meets annually in Boston, in June. Pres., Josiah W. Ball, Boston; Rec. Sec., E. O. Kinsman, Cambridge.

*Michigan State Dental Association*—Meets annually. Next meeting at Ann Arbor, Tuesday, June 7, 1893. Pres., N. S. Hoff, Ann Arbor; Sec., J. Ward House, Grand Rapids; Treas., Geo. H. Mosher, Jackson.

*Mississippi State Dental Association*—Meets first Wednesday in April, 1893, at Jackson, Miss. Pres., A. A. Dillehay, Meridian; Cor. Sec.; F. H. Smith, Grenada.

*Minnesota State Society*—Pres., C. H. Goodrich, St. Paul; Sec., L. D. Leonard, Minneapolis. Meets in St. Paul, September 6, 1893.

*Missouri Dental Association*—Meets at Excelsior Springs, Mo., second Tuesday in July, 1893. Pres., J. D. Patterson, Kansas City, Mo.; Sec., Wm. Conrad, St. Louis.

*Nebraska State Dental Society.*—Meets annually. Next meeting third Tuesday in May, 1893, at Beatrice. Pres. J. J. Willey, Wahoo; Sec., C. R. Tefft, Lincoln.

*New Jersey State Dental Society.*—Meets annually. The meeting will be held in 1893, exact time and place to be decided later. Pres., Oscar Adelberg, Elizabeth; Sec., C. A. Meeker, Newark.

*New Hampshire Dental Society.*—Meets annually. Next meeting will be held in Concord, N. H., time to be decided later. Pres., W. R. Blackstone, Manchester; Sec., Burton C. Russell, Keene.

*North Carolina State Dental Society.*—Meets in Morehead City, August 11, 1893. Pres., H. C. Hearing, Concord; Sec., C. A Rominger, Reidsville.

*North Dakota Dental Society.*—Will meet in Fargo, in 1893, the exact time not yet decided. Pres., H. L. Starling, Fargo; Sec., R. B. Foster, Grand Forks.

*Ohio State Dental Society.*—Meets annually. Next meeting at Columbus, first Tuesday of December, 1893. Pres., Geo. H. Wilson, Cleveland, Sec., L. P. Bethel, Kent.

*Pennsylvania State Dental Society.*—Will hold its next annual meeting in 1893. Time and place to be decided later. Pres., W. E. VanOrsdel, Sharon: Cor. Sec., C. V. Kratzer, Reading.

*Rhode Island Dental Association*—Pres., S. W. Clark, Providence; Sec , H. W. Gillett, Newport. Meets quarterly, second Tuesday in July, October, January and April. Annual meeting second Tuesday in July, at Providence.

*South Carolina State Dental Association*—Meets annually. Pres., C. S. Patrick, Charleston. Cor. Sec., H. J. Ray, Aiken. Next meeting at Columbia, S. C., in August, 1893.

*Texas State Dental Association.*—Meets in Ft. Worth, fourth Tuesday in May, 1893. Pres.. J. H. Grant, Austin; Sec., C. B. Lewis, Dallas.

*Tennessee Dental Association*—Meets annually. Next meeting at Chattanooga, first Tuesday in July, 1893. Pres., S. B. Cook, Chattanooga, Tenn.; Rec. Sec., P. D. Houston, of Lewisburg; Cor. Sec., R. R. Stubblefield, of Nashville.

*The Dental Society of the State of New York*—Meets annually on the second Wednesday in May. Next session at Albany, 12th, 13th and 14th of May, 1893. Pres., W. W. Walker, New York; Sec., C. S. Butler, Buffalo; Cor. Sec.. R. Ottolengui, New York.

*Vermont State Dental Society*—Meets annually. Next meeting in St. Albans, Vt., third Wednesday in March, 1893. Pres., George F. Cheney, St. Johnsbury; Sec., Thomas Mound, Rutland.

*Virginia State Dental Association.*—Meets in Charlottesville, Tuesday, August 19, 1893. Pres. J. Hall Moore; Sec., L. M. Cowarden, Richmond.

*Washington State Dental Society*—Meets annually. Next meeting will be held at Olympia, in May, 1893. Pres., Geo. B. Hayes, of Tacoma; Sec., F. P. Hicks, of Tacoma.

*Wisconsin State Dental Society*—Meets annually. Next meeting will be held at Janesville Wis., the second Tuesday in July, 1893. Pres., W. C. Wendel, Milwaukee; Sec , C. A, Southwell, Milwaukee.

*West Virginia State Society.*—The annual meeting will be held at Parkersburg, on the first Wednesday of October, 1893. Pres., J. N. Mahan, Charleston; Sec., Geo. I. Keener, Morgantown,

# Dental Register of the United States.

The first volume will contain a full and accurate list of Dentists in each State, arranged by States and Territories, and compiled alphabetically under the name of the city, town or village in which the Dentist is located; also name of college and class of graduation, when obtainable, and the postoffice address, as well as the population of the place. In large cities the office number and street will be given. Preceding each State much valuable information will be found, such as population, number of Dentists in the State, a summary of State laws covering the registration of Dentists, with penalties, etc. Following this part of the work will be a complete list of the Dentists of the United States, arranged alphabetically. Opposite the name will be given the page on which the name appears in the body of the work. This arrangement will serve as an index enabling one to easily locate any Dentist in the United States.

The work will also contain complete lists of all dental journals, their regular subscription price, name of editors and frequency of publication; all dental colleges in the United States, with location and Dean's, or Secretary's name, and faculty, and much other information of value to the profession, and those whose business is directly or indirectly connected therewith The whole will be so arranged that the names and locations of any or all Dentists in each State, city or village can be found at a glance. The REGISTER will be issued about the 15th of May. Subscription blanks sent upon application.

A. L POLK & CO.,
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THE

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# HYPNOTIC ANÆSTHESIA.

BY PROF. CHARLES GILBERT DAVIS, M. D. M. S. A. DEAN,

Lecturer and Clinical Instructor in Hypnotic Anæsthesia and General Surgery in The School of Anæsthesia.

[Delivered before the class.]

The world moves! As a flower unfolds it petals to the sunlight and the air, so the human mind is gradually evolving thought and revealing to the world beauties, of which heretofore, it had not even dared to dream.

It is interesting to take a panoramic view of life for the last one hundred years, and note the gradual but persistent action of the mind along any branch of scientific investigation. In whatever direction we turn, we always find the advance of truth being resisted by the opposing forces of superstition and ignorance. We hear ever the cry of "Treason! Humbug! Heresy!" And yet, with an irresistible force, truth advances, and the heresy of to-day becomes the orthodoxy of to-morrow. It is so in the political world; it is true of theology, and it is remarkably true in medicine and surgery. Poor Jenner was mobbed, Harvey was ostracised, and Ambrose Pare was called a charlatan, in the days in which they lived. But now! the world builds monuments to their memory, and writes their names high on the scroll of immortal fame.

Looking back over the history of humanity, it would almost seem that there existed a preconcerted determination, in every age, that no man in the scientific world should enjoy aught of honor save that which came to him through post mortem fame. But we must remember that the world is ignorant, very ignorant. We are only children picking up pebbles on the shores of time, while the great ocean stretches out before us unexplored. We do not know ourselves. We speak of mind, but we do not know what it is. We talk of force, and yet we cannot comprehend it. We write learnedly of the correlation of physical force and nerve force, but it is all a mystery. We record a few phenomena, we have seen repeated sufficiently often to enable us to classify them as "scientific," and there we stop, arch our eyebrows, look wise, stamp our conclusions as the ultimatum of thought on the subject, and defy any man to think differently.

But the way of progress is growing perceptibly easier. Bigotry is the offspring of ignorance, while humility is the child of wisdom. As the world grows wiser it also grows more willing to learn. Recent scientific experiments are leading us to suspect that earth, sea, sky and air are full of mystery and plethoric with surprises for the human race. As wisdom increases, the world grows better. How? Through impressions conveyed through the media of the five senses, hearing, seeing, smelling, tasting and feeling, registered in the receptive centres of the cerebrum. Through these five channels man has been intellectually nourished and so lifted from the condition of a savage, to the splendid manhood of the nineteenth century. Is this not another manifestation of force? And why has man not grown worse instead of better? Because, that which contends for his good is stronger than that which would do him an injury. If man is improved through these channels, then we must admit that force enters here. We must acknowledge that sound, language and words contain power. This is true. Thoughts are entities, and through language may be hurled like missiles impinging on the tympanum, be conveyed to the nerve centres and, there leave their impressions as manifest, as the scars on a fortress made by solid shot.

This transmission of thought, this suggestion, through the five senses to the central ego, is the key to hypnotism. The manifestations of its variations are as numerous as the human family. Some men can throw stones harder than others. Some men can hurl thoughts through words with greater effect than others. This is why all men are not equal in their efforts to produce hypnosis. The difference in the ability of men to command the nerve centres of others is well marked in legal contests before a jury. One attorney may make a learned address, clothing his thoughts with rhetoric and well rounded periods, but the effect on the jury is only soporific. Another attorney may take the same speech before a jury of equal intelligence, and the effect is electrical. Every man is wide-awake, and convinced that he is listening to the truth. The reason of this is that the last man knew how to hurl his thoughts, and drive them in "nolens volens,"—I say that he knew how—he *felt* that he possessed the God-given power to do it. Through suggestions sent through the eye, ear, and other sensory nerves, we produce the hypnotic condition. The patient is passive, obeys the command or gentle suggestion, and sleeps.

It is not my intention to give a discourse on the philosophy of hypnotism. To do so, I would be compelled to write a large volume. I only desire in this lecture, to give you some of the outlines of the subject, so that you may have a clear idea as to its nature.

The influence of one mind over another is not new. History, both sacred and profane is full of instances. From the hundreds and thousands of recent cures that have taken place within the last year, at Lourdes, in France, back to the healing of the lepers, and the turning of the water into wine at the marriage in Cana, we have an unbroken record of occurrences, not accounted for according to any known law. As the centuries have gone by, from time to time, some one has attempted to classify and arrange these phenomena, and so place the subject on a scientific basis. But the question has been slow in its development. The ideas of the investigators have been until recently very conflicting. Mesmer, more than a century ago built up a hypothesis. It was not tenable. He had numerous followers in France, Germany and England. But the question received no real scientific attention, until it was taken up by a Manchester physician, by the name of Braid, in the year 1841. It was he who gave the study of the phenomena the name of hypnotism. Recently the controversy has gathered around two centres, constituting two schools, differing in theory as to the nature of the phenomena. One of these is led by Charcot at Paris, the other by Bernheim at Nancy. Charcot and his school believe that hypnosis is a manifestation of disease, and is only seen in those of neurotic temperament. Bernheim and his followers, on the contrary, advocate the doctrine of suggestion, and argue that it is purely a natural condition, and that all persons are more or less susceptible to its influence. The controversial arguments, that have sprung from these two sources, have done much to throw light on the subject, and the question now bids fair to ultimately have a critical examination.

The opposition that this subject has met with is phenomenal. Some nine years ago, I presented the subject to a Chicago medical society, and the vituperation and abuse, emanating from ignorant and dishonorable sources, which were hurled at me are without parallel in the history of science. Not a voice in the whole society was raised in my defence, I asked for a committee, before whom I could bring these experiments. But the committee was ignorant of hypnotism, refused to review the subject, and, by a star chamber method of dishonesty, admitted one of my subjects to their presence, without my knowledge, and then had the audacity to publish his statement, that my experiments on him were not true. He had been bribed to go before this committee, by my accusers, and received $175 for his testimony—part of the money being paid to him through a hired lawyer. Since that time, I have steadily prosecuted my study of the subject, and have performed several thousand experiments. The result of these experiments is, that I believe hypnotism to be one of the most powerful therapeutic agents known to the nineteeth century. I believe that every individual can be influenced to a greater or less extent, and I know of no disease in which it may not be used with benefit.

Hypnosis may be defined as an induced tranquillization of the nervous system, in which the will is more or less in inhibition, and the subject open to suggestion from the operator. As previously stated, however, the variations are as numerous as the waves of the sea. No two individuals are exactly alike in their physical organizations, so they are dissimilar in their psychical manifestations. The same individual will often at different times, under varying circumstances, show different symptoms.

I have stated that we reached the conscious ego to produce hypnosis, by suggestions, made through the media of the five senses, hearing, seeing, smelling, tasting and feeling. The materialistic thinkers of to-day recognize no other means of communication of the mind with the surrounding universe. But this is by no means saying that there is no other window through which the mind may receive light. Our psychical friends are looking for a sixth sense. Our acquaintance with the phenomena manifested in this direction is not yet sufficient to enable us to demonstrate it in a scientific manner, and yet, I am prepared to say, that through my own experiments, I am led to believe in the existence of this psychical sense. That is to say, I believe it possible for mind to communicate with mind through another channel, entirely distinct from hearing, seeing, smelling, tasting and feeling. Our experiments so far are crude, and not always satisfactory, because of our not thoroughly understanding the laws governing these senses.

I shall probably have more to say in regard to this at some future lecture.

Through experiment and observation, we are led to believe that the great underlying principle of hypnosis is suggestion made through the senses. These suggestions may be made at any time, under any circumstances, but we always find them most successful and most enduring, when the mind is tranquil, or thrown into a quiescent state. We may produce this tranquillized condition by gentle monotonous motions or passes, or by deeply concentrating the attention on some subject or object. In this manner, the nervous system seems, as it were, to be polarized, so that its power may be attracted in any direction by the operator, through his suggestions. Experience and observation everywhere in life show us the effect of monotonous motion, or sound, in soothing the mind and producing sleep. The mother gently rocks the cradle and hums a lullaby for the child to slumber. We lie down on the shady bank by a waterfall, and are soon lulled to drowsiness. Who does not remember those delicious sleeps in the country home, high up in the attic chamber, where we sweetly dreamed, soothed to rest by the "rain upon the roof?" So we may produce hypnotic sleep by gentle passes. The surroundings should be quiet, the mind of both patient and operator should be entirely at rest, the light of the room be subdued, the subject in a reclining position, and the head at rest. He should be told quietly what to expect. And it may be explained, that in a short time after the passes have been made, he will begin to feel drowsy, his eye lids will grow heavy, and he will feel like sleeping. This preliminary explanation to the patient is quite necessary, especially in first cases, otherwise, the passes are not of so much avail. The patient must know *what* to expect. In this manner we make the passes doubly effective in a suggestive way. As we proceed with the study of the subject, we shall observe, more and more, that the basis of it all is suggestion. We may produce hypnosis in another way, by having the patient look fixedly at some small and bright object held a few inches from the eye. The most obtuse nervous system seldom fails to yield, more or less, to this method.

In short, the methods for producing hypnosis are almost innumerable. A sudden sharp noise, such as a blow on a gong, or the unexpected firing of a cannon has been known to throw an individual into the hypnotic state. A sensitive subject may not only be hypnotized by another—hetero-hypnosis—but he may often hypnotize himself—auto-hypnosis. I have seen a number of such cases, who were remarkably sensitive, having been hypnotized a number of times, who could, by fixing the eye on some small bright object, or even by a quiet train of thought, throw themselves into a condition of lethargy or catalepsy, and so remain for some time. But no matter from what source the hypnotic power comes, whether from the patient or the operator, we are always able to trace it back to an idea which we recognize as suggestion. All of the recent manifestations which come under public notice as mind cure, christian science, mental healing, etc., are nothing more than cases of hypnotism, and in every instance may be traced to a suggestive source. Faith, hope, expectancy and belief, are all sources of suggestive thought. And in every case of mind cure, or christian science, we find one or more of these combined to act as a motive power. I have frequently heard patients declare that they went to the mind healer, without a particle of faith, and were, greatly to their surprise, healed. But in the very act of going they showed their hope or expectancy. I have no doubt but what many cases of disease are cured by these means, but the vulgar idea as to the cause of cure should be done away with, and they should be scientifically classified where they belong, as cases of hypnotic suggestion.

When Christ made ointment of the clay, and applied it to the blind man's eyes, we do not any of us believe that there was any real efficacy in the clay itself, but it was only a means or medium for conveying the powerful suggestions to the nerve centres of the blind man, and thereby arousing the nutritive forces of his system to throw off the diseased condition. Our theologians explain these miraculous occurrences by simply saying they were worked by the power of God. They may think my attempt at an explanation sacriligeous. But we must remember that God is the author of all law, and never known to work beyond its influence, and it is blasphemy to accuse him of working without harmonious action. Christ well understood the law of suggestion, and all through his earthly career made use of it.

The influence of the mind over the body is continually attracting more and more attention, and as it is studied, many of what previously appeared to be remarkable or supernatural cases are easily explained as coming under the domain of systematic law. Nothing ever happens. Every instance and occurrence in life may be traced to its legitimate cause. There is no such thing as supernatural—it is only superusual. We do not yet understand all the forces of life. Men are simply pigmies, spoken into existence on a floating island. Their eyes are just opening and blinking as they catch the first glimpses of the sunshine of knowledge, and clinging with terror to the life on their puny sphere, while the great universe around them is ablaze with life, power and sound.

We hope through the study of hypnotism to throw much light on many questions pertaining to life and happiness. The objection is often raised that it is dangerous to be practiced, and that with a spread of knowledge on the subject, crime would increase. The same objection may be raised to chloroform, ether, and all other blessings which science and inventive genius have unearthed for the happiness of the human family. History will tell us that an increased knowledge of any force has never brought aught but blessings to the world.

Now what are some of the symptoms of hypnotism? Charcot, of Paris, has classified these symptoms into three stages: First, the state of lethargy; second, the state of catalepsy; and third, that of somnambulism. I believe from experience that this classification is more theoretical than practical. I do not think they are well defined, except in a few cases, and these are always under the suspicion of being drilled by repeated experiments. In most instances the stages merge into each other so imperceptibly that they cannot readily be distinguished. Different subjects show different symptoms, according to their various traits of character.

Under the influence of hypnosis, the symptoms are as various, or more so, than under the influence of alcohol. Usually, however, the patient remains quiet and makes no demonstration, except at the command of the operator. The sleep partakes much of the nature of natural sleep; the muscles are relaxed; the eyes close with frequently a slight tremor of the eye lids, and by some authorities this latter symptom is considered one of characteristic occurrence. I do not, however, consider it as an invariable symptom. While in this sleep, we have manifested what has been termed a *neuro-muscular excitability*. For instance, if the surface of the arm or forearm be gently stroked with the ends of the fingers, the muscles of the part will contract 'till the limb is completely rigid. In many instances, it will be noticed, that these contractures are anatomically correct; only those muscles becoming rigid which are acted upon by the nerves which have been excited.

The tendo-reflexes vary in different subjects. My general observation has been that those subjects in which the cataleptic symptoms predominate show always a diminution of the tendo-reflexes, while in those who show symptoms of complete relaxation or lethargy, we have the reflexes often very markedly increased.

Anæsthesia and analgesia are usually present to some extent, though they are more marked in some subjects than in others. These two conditions are very subject to direct suggestion, and can nearly always be demonstrated to some extent in any subject who has been thrown into the hypnotic sleep.

In a future lecture I shall take up this branch of the subject and endeavor to show its present scientific status. This hypnotic sleep may be utilized in many ways. It may be useful to relieve pain and give rest to a tired or disturbed nervous system, and while in this state, as I have previously explained to you, the mind of the subject is a page, as it were, on which we may write new thoughts, or erase the old ones. It is like a musical instrument, upon which we may play, as we desire. It is open to suggestion through this channel, and we may speak and correct abnormalities or perversions, rouse the forces that are dominant, or suppress thought currents that are too powerful. Not only do the cerebro-spinal nerve centres respond, but even to the farthest distribution of the sympathetic we may send the command and be obeyed. Through this means I have seen the bowels act, the kidneys stimulated, the circulation increased, and every tissue of the body respond to stimulation. Even in organic disease, where great structural changes have taken place, I have seen such improvement as to warrant me in believing that there is a field of discovery awaiting investigation here, and well worthy scientific attention. Its possibilities in the future are great.

An interesting feature to note in relation to suggestion is the fact, that it may always be made more or less effectual, for some length of time, even after the patient has received it. This peculiar action has been termed post-hypnotic suggestion. To illustrate, the subject may be hypnotized now, and we may tell him, that at a certain hour to-morrow, he will feel sleepy. We awake him, and if we observe his actions on the day following we will find, at the time mentioned, he has a tendency to drowsiness, resulting in partial or complete sleep, according to the patient's capacity to respond to the suggestive influence. This is a very interesting fact, and one that may be utilized to a good purpose in the cure of disease. It may be made particularly useful in the administration of medicines. It has been said that "As a man thinketh, so is he." Quite true, and for this reason, I think it always well, that intelligent patients should be impressed thoroughly with what it is intended the medicine should do. Through the action of this law of suggestion remedies, no matter what may be their direct or legitimate therapeutical action, are very much inclined to act, according to the expectations of the patient. Frequently this suggested idea is much stronger than the natural or intended therapeutical action. I have prescribed ferrocyanide of iron which, we will remember has a deep blue color, and seen fearful ptyalism follow in three days, because some friend had suggested to the patient that she was taking blue mass, and it was sure to salivate her. I have seen one grain of calomel produce a sweet night's sleep, after several days fruitless attempt to produce sleep by chloral or the bromides. This was done by impressing strongly on a patient of neurotic temperament, the efficacy of the dose, and its great potency to produce sleep.

From these ideas, we will see the great importance of making our suggestions as nearly as possible, along the line of known scientific truth. These impressions may be made at any time. It is not always necessary to have the hypnotic sleep, in order to make suggestions. I wish only to say, that as a rule, suggestions are more lasting and powerful, when made during hypnosis.

While in this induced dreamy or semi-conscious state, any tissue, organ, function, or sensation of the human body is open to command. With this idea well before you, it will not be necessary for me to dwell at length upon the great avenue, that seems to open up for the alleviation of human suffering and the production of happiness. I might dwell for hours upon the medical, legal and educational aspect of hypnotism, but for the present, I desire only to direct your attention to the relation, which it bears to the states of unconsciousness and inability to experience pain, which are designated severally by the commonly accepted definitions of anæsthesia and analgesia. We must have a clear and direct knowledge of these two conditions, for we do not always find them associated in every case of hypnosis, as far as concerns the general condition of the patient. The patient may be hypnotized, open to suggestion, and still instead of loss of sensibility, we may have really a condition of exalted sensation. Through post hypnotic suggestion, we may have complete consciousness, and yet loss of sensation, or anæsthesia, in any limb or part of the body, we may select. Though in every case of hypnosis, we do not have complete or even partial loss of sensation, still this condition, as I have previously stated, is always open to suggestion. Whether the patient feels pain or not, depends not so much merely upon his being hypnotized, as upon whether it has been suggested to him, that he will experience no pain. In fact, I believe, there are but few subjects, but would experience pain during a surgical operation, at the first time of being hypnotized, unless it was emphatically suggested to them, that they could not feel. With this misunderstanding, I have often known operators to make complete failures, and in their disappointment to doubt the efficacy of hypnosis as an anæsthetic.

The history of hypnotism as an anæsthetic goes back to the remotest antiquity. It has even been suggested by some enthusiast, that Adam was hypnotized in the Garden of Eden, when a surgical operation was performed, and he had one of his ribs removed.

I would not vouch for the scientific value of this statement. But through Grecian and Roman history, we catch glimpses of its having been utilized to soothe the mind and quiet pain. The priests, it is said, threw the people into a trance or sleep in the shade of the temples, and their dreams, while in this condition were said to be prophetic. The ancient literature of India is full of intimations in regard to the workings of an occult power, which some individuals seemed to be capable of exercising over others. Coming down to more modern times, we find the first scientific record of its use to be about the year 1821 when Recamier began operating in Paris, with the assistance of Baron du Potet. In 1829, Cloquet recommended it as an anæsthetic for surgical operations, but the usual cry of "impostor" was raised against him. So far as I know the first application of hypnosis to dentistry was in 1834, when Auded recommended to the French Academy of Medicine, the advisability of using, what he termed, the magnetic sleep, for the purpose of producing anæsthesia, for the extraction of teeth. The usual epithets of charlatan and impostor were hurled upon him. About 1846 Esdail began using it as an anæsthetic for surgery in the hospitals of Calcutta, and during the same period Braid was using it for the same purpose in England. Among other prominent operators, who made use of this agent, we may mention Ford, Azam, Tillox, Voight and Lefort.

As before stated, hypnosis is not applicable in every surgical case, and yet I believe that it could much oftener be used if the experiment were only tried thoroughly by a competent and confident operator. In every case of surgery, where other anæsthetics are, for physical reasons, considered dangerous, I would always suggest a trial of hypnosis. Its use is also to be recommended in obstetrics, and the list of those who have used it for such a purpose is large. We may mention Liebault, Thomas, Voight, Fillossier, DeYoung, Pritzl and Secheryon. I have myself on several occasions made slight attempts to utilize hypnotic suggestion during, labor with quite satisfactory results. I am sure, that with selected cases, this would prove a good field for its useful application. In my own experience, I have a number of times utilized hypnosis as an anæsthetic, for surgical purposes, and under its influence have opened boils, lanced abscesses and buboes, and performed numerous other minor surgical operations.

In 1889, while the National Dental Association was in session in Chicago, several gentlemen, prominent in the profession, called upon me, and requested that I should show them some experiments in hypnotism. I consented, and met them at the office of Dr. M. Stout. Among the number of prominent dentists present, on this occasion, I may mention W. H. Atkinson, M. D., D. D. S., of New York; W. X. Sudduth, M. D., D. D. S., Editor of the *International Dental Journal*, of Philadelphia, Pa.; Prof. Taft, M. D., D. D. S., of the University of Michigan; Dr. J. H. McKallop, of St. Louis, Mo., and W. W. Allport, M. D., D. D. S., of Chicago.

My subject was L. D. W., a young man, whom I had previously hypnotized a number of times. He was of sound health, and of good vigor of body, and with the exception of one or two teeth containing cavities, had no complaint of ill health. He was placed in a dental chair, and in less than three minutes was completely hypnotized simply by holding his hands, looking into his eyes and commanding him to sleep. In this instance, anæsthesia appeared to be complete. The limbs relaxed, the breathing became deep and regular, and the conjunctiva insensible to touch. While the patient was in this state, Dr. Stout proceeded to enlarge the cavity, and as I remember, opened thoroughly the cavity of the tooth, which he then proceeded to fill.

I have often heard it stated, that in extracting and other operations on the teeth, constant and repeated hypnotizing was necessary to prevent the patient from returning to consciousness. But the experience of this case is a direct contradiction to this statement, for immediately after I had hypnotized the patient, I left him in the care of the gentlemen above mentioned, and returned to my office. At the expiration of about an hour, they sent for me, stating that they had finished the work, but were unable to awaken him. I found him sleeping quietly and soundly. With simply a touch on the forehead and the word "Awake," he was roused. He expressed himself as feeling well, remembered noth-

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ing, and was quite surprised, when given a hand mirror, and told to look, that one of his teeth had been filled.

So far as I know, this is the first tooth ever filled, while using hypnosis as an anæsthetic. In the few cases, in which I have applied it, I have had complete success, but as a rule, have only administered it to those subjects, whom I knew to be peculiarly susceptible to its action. As I say, in this case, it appeared to be, as it undoubtedly is, an ideal anæsthetic. It fulfills all the requirements and indications. The loss of sensation was complete, or sufficiently so, for all purposes. There was no depression of function of any of the vital organs, and I regard it, in this respect, as peculiarly safe. And again, what is to be greatly commended—there are no unpleasant after effects. It is not followed by languor, depression, nausea, or any of the unpleasant symptoms, which so frequently accompany the administration of many chemical anæsthetics. I am often asked the question, whether or not, I consider frequent hypnotization as injurious. My answer to this question would have to be somewhat explanatory. The simple act of hypnosis itself, I do not consider injurious, when experienced even daily. It cannot be otherwise than restful to the nervous system, leaving an effect somewhat similar to that, which follows deep and natural sleep. But I do think, the benefit or harm depends somewhat upon who does the hypnotizing, and for what purpose, it is used. The subject is always impressed through suggestive forces by the mind and disposition of the operator. Again after hypnosis is accomplished, great harm or conversely, great good may be accomplished, by the suggestions delivered to the subject by the operator. As I have stated, in a previous lecture, while the patient is in this state of hypnotic lethargy, his mind is like a tablet of wax, or a blank page, upon which we may make impressions, which are liable to continue for a greater or less length of time, and are more or less harmful or beneficial, according to what they are, and for what purpose made.

So we see that hypnosis, like all the great forces of the universe is useful, and yet it may be powerful to produce harm. And still, when we come to measure the good or evil resulting from any great discovery, we always find a large preponderance in favor of the former.

We have considered hypnosis as an anæsthetic in surgery and obstetrics, and have also seen that it has been utilized to a slight extent by the dentists. The question we wish to consider to-day is, to what extent it can be used by the latter profession. It is a peculiar fact, well known to those, who are frequently engaged in the administration of chemical agents to produce anæsthesia, that the manner in which an anæsthetic is given, has much to do with the effects and amounts given. If the patient is by force overpowered, and while cowering with fear, given the chemical agents to inhale, it will be usually observed, that the amount required is much greater, and even then, the anæsthesia is more or less incomplete and marked with disquietude and delirium. This is because the sub-consciousness is disquieted and stands, as it were, on guard watchful to prevent harm coming to the subject. On the other hand, if the patient is previously quieted by a few soothing words, if he has full confidence in the one administering the agent, he sinks quietly to sleep, taking a much less quantity and rests much more quietly through the operation. This is really suggestion acting through or with hypnosis. So near akin is the anæsthesia of chemical agents, to that from hypnosis, that I have often seen a patient transferred to complete hypnosis, while taking chloroform or ether. I have now a number of incidents in my mind, where I was giving ether or chloroform, previously soothing the patient with gentle words and a few passes over the eyes, have had the pleasure of seeing him pass into a pleasant dreamless sleep, before more than a few drops of the chemical agent had been inhaled.

Gentlemen, I have the pleasure of bringing here before you to-day a subject for the purpose of illustrating some of the symptoms of hypnosis, concerning which I have spoken to you.

This young man that I present to you here I have previously hypnotized a number of times and we shall probably find no difficulty, in a few moments, in throwing him into the hypnotic state. I place him here in this dental chair in the usual position occupied by a patient for an operation upon the mouth. I hold before him this small glittering point; have him fix his eyes directly upon it, quiet him with a few soothing words, and say to him :

"Now you are sleepy; you are growing drowsy; your eyelids are feeling heavy; you will soon be asleep; you are now going to sleep. Sleep, sleep soundly." And you will notice that as I speak these words his muscles relax, his eyes close and the bright button that he held in his hand has fallen. You will examine closely and find that he is thoroughly unconscious, that is unconscious to everything that may be spoken to him excepting that which I utter myself. He has all the symptoms of thorough anæsthesia. Upon raising the eyelid and placing the finger upon the conjunctiva, you will notice that there is no resistance. This itself is sufficient evidence to warrant complete anæsthesia. But you will observe another symptom here which you do not find in ordinary anæsthesia resulting from chemical agents, and that is that the limbs remain in any position in which they are placed. As I raise his arm you will notice when I let go it remains exactly in that position. Then I flex the forearm at the elbow and still it remains. I raise one of his lower extremities, flex the limb at the knee and still it remains in the exact position in which I placed it. This is, you are well aware, what we call the cataleptic condition and these contractures may be overcome by a sudden blow upon the limb. For instance, I strike the arm and it drops, again another blow upon the lower extremity and it falls to its original position. I now elevate the patient in the chair and command him in a deep, strong voice to open his mouth. He does so and holds it in a position perfectly rigid and fixed. I place the head back upon the head rest of the chair and you will notice now the patient occupies the proper position for any operation that you may desire to perform upon the teeth or mouth.

You will notice in examining his teeth that there are several of them very deficient, requiring filling, and I promise you at some future time to have the operator proceed with the work necessary to be done here and fill these teeth under the influence of the anæsthesia of hypnosis.

# THE FORCES OF LIFE.

## THESIS
Delivered in The School of Anæsthesia.

BY E. WARREN DOOLITTLE, M. D. M. S. A.

The study of the character and application of the forces covers so large a field that I shall only endeavor to point out a few facts, hoping thereby to awaken in you an interest that shall lead you to see some of the hidden beauties of nature—especially those which concern psychic force. We have but two forces—spiritual force and material force. Spirit or mind is the primary force and, according to the laws of the universe, must go forth in the physical world, through the channel of a fluid.

To illustrate: Water turns the wheel, the wind the wind-mill, steam propels the engine, and a substance within the nerves the animal muscles, tissues and the blood.

The fluids are the finer, and the wheel, the mill, the engine, and the animal tissues, the coarser elements. If force embraces the finer elements on the one hand, and a coarser element with which it comes in contact on the other, then air alone is not force. While it is a force within itself, having ethers which play through oxygen, and nitrogen, to produce the effect of heat and cold. Yet this same air alone is not the force which runs the internal machinery of the wind-mill. This must embrace two elements—first, the sweep of the air creating wind, and the arms of the mill to catch that wind. The air alone would be powerless to move any machinery. The flow of ether through the air produces heat, this heat, expanding the air, causes it to rise, and the rush of colder air to fill its place, gives the effect of wind. This wind may destroy cities, overthrow vessels, and drive every thing before it, and seems like a secondary force, but is only an instrument, which is set in motion by the play of those fine ethers, producing heat, and making a combination of forces.

A stone hurled by my hand is no force, so far as the stone is concerned, but the hand that threw it imparted the force.

The fludic part consists in the nerve ethers, that are sent to muscles. These muscles constitute the coarser elements of force, which, becoming contracted, are made to hurl the stone. The question of the application of the forces, are of particular interest to us, as they are brought into play in connection with the study and practice of Anæsthesia. We should draw out every point, and make us familiar with the relative workings of the forces employed in this art and science.

As the desired results, (and the often acquired results) of chloroform or other narocotics in the system differ very widely, I shall deal in what I say mostly with the human body, and of those things that seem neeessary to an understanding of our subject.

The human body has numerous magnets, galvanic batteries, and electrical combinations, all worked by spiritual and the most exquisite chemical forces, and arranged into positive and negative poles. The arms form a horseshoe magnet, the right being the positive and the left the negative pole. The legs form another magnet. The fingers and toes a series of magnets. The head is a compound magnet with the positive pole at the forehead, and the negative at the occiput. The liver and spleen, with their connecting nerves, blood vessels, and cells, form a bar magnet.

The right and left kidney, also the duplex portion of the sexual system, with their connecting tubes of nerves and blood vessels, constitute electro-magnets, that are kept in motion and activity by galvanic and other chemico-vital processes.

The brain is the great galvanic battery of the nervous system, the electricity being generated by numerous cells. Its principal cell being the ganglia of the cerebrum, its smaller cells being the ganglia of the sympathetic and sensory nerves, while the conducting wires are the nerves and nerve fibres themselves.

The heart is the center of the vascular system, in which force is brought into action through electrical nerves, veins, and arteries. It is quite necessary that the lungs, liver, kidneys, spleen, etc., are kept well supplied with pure blood, and through trays in the form of capilaries and smaller blood vessels.

It is of vital importance that the blood should at all times be kept well supplied with its life giving principle, free oxygen. Chemical combinations are formed in all parts of the body. The chemical law that never fails to hold good, is that polarized electricity—the magnets—seek equilibrium by chemical affinity. One important arrangement of chemical force is caused by the union of the thermal color, red, and the electrical color, blue, and this is exemplified in almost every function of the body. Thus, the blue venous blood, and the red arterial blood, work together in the right and left side of the heart.

The bluish white interior matter of the cerebrum lies up against, and interblends with the cellular reddish gray matter of the same. And as this junction may be the point of the greatest chemical activities, from the fact that the sensor nerves, from all parts of the body, convey impressions thereto, we may deem it the true sensorium. I do not mean to say, however, that consciousness, sensation, thought, etc., are merely or entirely the result of chemical action, but, I do say that this is true, except so far as everything is concerned, save that all-pervading spirit force.

The bluish white nerves are the nerves of sensation, and the reddish, those of motion. It is thus we see that all through the system we have the bluish white elements, answering to the zinc plates in the battery, and the reddish grey or yellowish elements, as in the sympathetic ganglia, answering in the place of the copper plates. And carrying it a step farther, we have the fatty substances acting as the carbon plates, and the blood as the solution, to generate, and set in motion our electrical current, as we have all of the elements of a complete battery; giving us a brisk play of the ethers through chemical action, and thus the system is kept full of heat, life and power.

Thus, we see that everything goes to prove, that electrical and thermal forces rule everywhere, throughout the domain of tissues, veins, arteries and nerves, and that even the spiritual forces, which underlie, and quicken the whole, work in harmony with chemical law; which always requires electricity and thermism.

Physiologists claim, that nerve force is not electricity. Why? Simply that it will not move the galvanometer. Such an opinion is an error and arises from a want of an appreciation of those finer forces; and a want of knowledge of the basic principles of any save those coarser galvanic and frictional electricities.

The finer vital, or psychic electricity, which they do not recognize is no more to be measured by the galvanometer, than is the temperature of the north pole to be measured by my fever thermometer.

To make conscious sensation the nervous ethers must make a complete circuit, passing from the point of irritation by the sensory nerves to the cerebrum, and then returning, by the motor nerves to the point of starting. In a normal state the nerves carry the ethers from the brain, and the sensory nerves carry the ethers to the brain.

The functions of the special senses, as sight, hearing, smell, taste, and touch, are all exerted by means of thermal and electrical currents; working through chemical laws.

The most refined of these, the sight, is acted on by the ethers alone. Hearing, the next in refinement, by the ethers, and atmospheric gases. Smell by gases mainly. Taste by liquids and semi-solids, and touch, with solids, liquids, gases and ethers.

The organ of sight deals with luminous ethers, in the form of light and color, through the medium of which the universe is revealed.

Hearing is *said* to be accomplished by air waves striking against the tympanum, but it is especially accomplished by electrical and thermal ethers, which go far beyond the tympanum; into the interior portion of the ear; sent forward by the vibratory action; in connection with the liquid, sounding boards, bones, &c , until the cochlea, the presiding genius of sound is reached, and its impression conveyed to the auditory nerves, and thence to the sensorium. The wonderful scales of the cochlea consisting of 3,500 outer and 5,200 inner rods of corti constituting a grand harp of 8,000 cords of constantly increasing length, so that every grade of musical tone may have an answering element that shall communicate an exact perception of pitch. The fact that sound may be communicated to an ear that is under water or telephoned hundreds of miles through wires shows that the central principle of sound does not *consist* of air waves, but of some electrical fluid, or ether, which is much finer and swifter, although the air is a necessary and valuable assistant; and its waves can and do modify musical tones.

The sense of smell as I have said, has to deal with gases: and yet on these gases are carried minute particles of different substances, such as ammonia, the effluvia from diseased bodies, emanations from flowers, &c. These particles, flowing in on the gases to the nasal passages find their peculiar, chemical affinity in some portion of the mucus membrane, or epitheleal cells to which they are attracted; and their impressions carried onward by the olfactory nerves which are three in number, arranged side by side, the middle one being reddish-grey; the others more of a bluish-white, thus completing again, the circuit of our battery, by the zinc and copper plates in the form of nerve tissue.

The sense of taste, is generally presumed to exist in the papillae on the top of the tongue, there are three sets of the same, differing in size and appearance, and said, each to have its special function, in the production of taste. By experiment, however, it can be clearly demonstrated that fruits and other edibles, have but little if any taste when not in a fluid or semi-fluid form and then pressed between the top of the tongue and the roof of the mouth. Take a cherry, grape or plum and break the skin, so as to let the juicy pulp come in contact with the top of the tongue, and the unbroken skin in contact with the roof of the mouth, and you will find the peculiar taste of the fruit will be entirely wanting Why? Simply because the electrical current is broken. The skin acts as an insulator preventing the electrical current from passing from the tongue to the roof of the mouth, thence to the brain by the sensory nerves and then back again to the tongue by the motor nerves. The reason we taste liquids better than solids, is that liquids are better conductors of electricity than solids.

*Poison* is a force that may be said to cause *discord*, and if intense enough in its action, DEATH; by being one-sided, or ill-balanced in the style of force, having an excess of thermism on the one hand or of electricity on the other. Thus alcohol has two parts of carbon, a yellowish element; six parts of hydrogen, a red element, and only one part of the blue electrical element of oxygen, making the chemical formula $C_2 H_6 O$. Hence it is on the fiery order and makes it a thermal poison. Of course these deductions are based upon the use of the spectrum and its senalations. Chloroform has the electrical element of chlorine in which the blue-green, blue and indigo are powerful in its spectrum. Its formula $C H Cl_3$ shows enough of the red and yellow principle of its carbon and hydrogen to rouse the nerves and blood to powerful action, and enough of the contractive power of the chlorine to paralyze the heart, and cause death; or rather, in better keeping with our present teaching, I would say it may cause shock and thereby paralysis of the heart result, because of the paralysis of the sympathetic nerve ganglia. Of course as soon as the sympathetic nervous system is affected even in the least degree, the rythmic movements of the heart are affected and will be interfered with exactly in accordance with the degree of injury acquired.

The administration of any narcotic agent is attended with many chances for much good or much harm; the result depending on not only the condition of your subject but upon your thorough knowledge, or your absolute want of knowledge of your narcotic, your battery, your brain and your system you wish to anæsthetise. If you fail to understand the physical, chemical, thermal and electrical character of your drug, and above all, if your knowledge of the human economy, and of the brain especially, and of the exact part of that brain you wish to affect and the part you wish to leave intact, you are not yet qualified to PRACTICE the art and science of anæsthesia.

If you do not look upon the brain, and system as a battery, and understand thoroughly how to operate, you are still unfit for the undertaking. And if you are not able to take a *scalpel*, theoretically at least, and dissect that brain so that you may have in continuance the force and functions of life under modifications, with absensation you are still a failure. You must dissect away the cerebrum as it presides over all conscious acts and is the only part that can recognize or take cognizance of pain. But if your knife should sever or bruise the medulla you may have syncope, or asphyxia; either of which you are to very carefully avoid by being extremely careful in your dissection. I think that so long as the cerebrum is not cut off, as it were, from the rest of the economy, as in the first and second stages of Anæsthesia, that we are more liable to accident to surrounding tissue, especially the medulla, than in the third stage where we have perfect quiet and a complete separation of the conscious from the unconscious acts.

Applying this same rule to a narcotic, we have the conscious will of the patient and a susceptibility to external and surrounding impressions, which being communicated by the mind, or yet conscious portion of the brain, and through this channel reach the great sympathetic ganglia.

This condition or accident does not follow after the third stage, or at least is not so liable to do so.

Of course, we may unconsciously wound the medulla, and only be aware of it by all at once, recognizing the fact that our electrical current is irregularly vibrating, or entirely suspended. We know this, because it is shown to us by a pallor, a purplish appearance of the face, slightly irregular breathing, or an irregular heart beat. Any one of those many conditions, may arise to indicate to us that we must be alive to the responsible position, we have assumed and must look about us at once that we may know just where the difficulty arises, if in the zinc plates, the copper plates, or the carbons, remedy it. If in the solution see to it that it is not impoverished. Our success in dealing with and repairing these evils will depend entirely on our knowledge of anæsthesia.

When we begin the administration of any narcotic, we see to it that we have and keep the balance of power in our own hands as it is much easier to *keep* up all of the functions of life than it is to *re-establish* them after they have been in any way interfered with or suspended. It is in the unbalanced conditions where we find the diseased conditions. For instance a neuralgia is resultant from the depolarization of the substance of the nerves, which interferes with that even flow of the nervous ethers or fluids, causing thereby an electrical tension which is ever bursting in irregular and *darting* streams, which gives the most intense pain.

It is *said* that *pain* is *excess* of energy of nerve centres. Such a statement is to my mind erroneous as it is much more likely a *lack* of energy in those centres. You seldom see a robust, or what you would deem a healthy person suffering from pain. A person possessing the full tide and power of life, will send the nerve fluids so *strongly* and *thoroughly* along that they will sweep away all obstructions and polarize the nerve fluids into straight and even lines.

We all recognize the fixed law in all nature, that every thing is divided into separate and thoroughly distinct degrees; or in other words that every thing is built upon a sliding scale. This is so completely done that there is not one exception to this fixed law, *no, not one*. Another law of nature is that coarser force can in no way have any possible effect on a finer one, and on the other hand we see that no finer force has any effect upon a coarser one, except through the intermediate forces between the finer and the coarser force desired to be acted upon. To show this gradation, we will say we have solids, semi-solids, liquids, gases, ether; spiritual potencies or agencies, and spirit. Thus we see that at the ultimate, on the one or lower end of the scale is solid or material force, while at the other end of the scale, we have a something finer than any material condition, something unatomic, infrangible, imperishable and almost infinitely elastic, which can flow forth in the finer atomic channels as a quickening power, thereby giving life to the world, and becoming a positive principle which we will term *psychic* or *spirit* force.

We percieve then that matter is a negative principle of force, which draws spirit into itself through the suctional power of its atoms. Matter cannot act without spirit, nor can spirit act without matter, as each is essential to the other, and powerless the one separate from the other; only in concerted action *can* they act as is so nicely and thoroughly shown in the human body. To show that there is no power only as is manifest in that ever ascending scale, we will look to the different forces or manifestations of force, under the control of the supreme ruler of the body, the brain. If I wish to raise the bone of my forearm, I must not, or cannot do so except as I bring into play all of the intermediate forces, for instance the will power has no earthly effect only as it goes to the nerve ethers, then to the nerves, then the muscles and thus by the direct effect of the muscles the arm is very quickly raised. Another step higher the same grade is again brought to bear as before, only as the muscles are a step higher in the scale it is not required that we descend so far by one degree. And yet *it* is *many* degrees from the fountain head or the all governing power, the brain. Then still farther up we see the nerves powerless to act, save as they have an order or aid from above, in the form of those vital electricities. Then still above all these we have those ever present and all pervading spiritual potencies which is the acme of all forces, save the one great *Deific fountain-head*.

The more we look about us, the more we realize upon what a grand and-perfect scale is everthing built. On the one hand, we have the low and common things of earth, both of the inorganic and organic character, and from these low inorganic materials, we ascend on that same sliding scale to the more complex of the chemically combined inorganic elements until, we reach a state like that of both elements that is so nearly organic that they shade off so gradually that we can scarcely tell where the one leaves off and the other begins, and from this tiniest of all plants we, step by step, ascend the scale through the ever changing grades until we reach the mammoth trees of the Yosemite; and again, we begin with the lowest grade, so low in fact that it is perhaps more vegetable than animal. I refer to both the sponge and mamosa or sensitive plant. Then the almost invisible little parisite, another step upward, and still, step by step, through the many lights and shades of change until we reach the huge mastodons of primeval days and the great monsters of the deep and jungle.

In a *psychical* sense, we see the same gradation manifest at every step until is reached, man, God's crowning work.

We thus see that in all nature, we have the same conditions, whether it partains to the inorganic, the organic, the lower forms of vegetable or animal life, or whether it applies to the physical or vital processes, or to the vital or physical, it observes that same unalterable law. We also observe that throughout all these parts of a grand universe, that the same fixed law of the action of the forces exists as obtains in the human economy. That is that there is a supreme fountain head from which emanates all action not directly, but by that force being made manifest to a force beneath and thus downward through an unbroken chain to the coarser or material elements. But never can this transmission be reversed and force made to ascend the scale as we see exemplified on all hands and in all nature; and thus we see that every force has a superior governing force, and this follows on upward until we again reach the Great Author of the universe. If one force is then so surely subject to a force above and a higher power, then how essential is it for us to so thoroughly understand the generation, and application of them, that we may make them subservient to our use. As we gain new light and understand new principles, or rather the application of old ones, so much better will we be prepared to guide, control and make use of the forces already within our grasp.

# TUBERCULOSIS: HOW TO PREVENT IT.

G. H. SOMERS, A. B., M. D.

"An ounce of prevention is worth a pound of cure" is a proverb stale and ancient, yet its teaching none the less true and valuable, and it impresses one of our proneness to forget its truths when he considers the advancement that has been made in the treatment of disease both therapeutically and surgically during the last two decades; the wonderful acquirements in the knowledge of specific causes and factors in the production of pathological conditions and the paucity of measures and means developed for stamping out these preventable conditions from our midst. Developed, I say, because with the knowledge of causes, we have theories, not hypotheses, which if put into practice would result in a greatly decreased demand for "pounds of cure" if not preventing the ravages of such diseases as consumption, syphilis, diptheria, scarlet fever, typhoid fever, etc., etc. Undeveloped, why? Two reasons mainly. First, lack of interest—putting it mildly. Second, the prostitution of the profession to personal interests and ambitions by him who seeks to obstruct rather than improve the sanitary administration, opposed to all medical legislation except that which permits him, free-handed, to violate every sacred tie of humanity and gives him the opportunity of filling his pockets with money by any mean scheme or foul practice regardless of morals or decency. But it is not the purpose of the paper to speculate upon the reasons of present conditions, but the conditions themselves and how to avoid them and urge the necessity of being alive to the responsibilities under which we are placed and of being willing to do our part in bringing about such legislation as shall result in much good for the people whom we serve.

There is no problem that pertains to medicine to-day of so much importance as the prevention, cure and treatment of tuberculosis, and no effort should be neglected whereby its ravages may be arrested. A disease causing from seven to fifteen per cent. of all deaths; responsible for the maimed and crippled condition of thousands; a disease the cure of which has been as eagerly and earnestly sought as was the source of gold by the ancient philosophers, but having comparatively little attention given to its prophylaxis. As a result the death rate gradually increased until the last decade, when, through the wonderful discovery of Dr. Robert Koch, the nature of the cause was shown, its contagiousness and facility of dissemination made known. Then the profession began to look about them for methods of preventing as well as of successfully treating it, and we find as a result a diminished death rate in the large cities of our own country. With such success attending efforts in such a frail way, can we not reasonably expect to reduce it to a fraction of its former self by enforcing upon our people a proper respect for the health of existing and coming generations? But to come to the point. We have in this city—allowing five cases of tuberculosis for every thousand living—between six and eight thousand cases of pulmonary tuberculosis, and this is a low estimate, for the deaths last year from this cause were 2,177. What measures are taken to prevent this vast number from spreading its infection into every home!

One of the most frequent modes of infection is by inhalation. Yet this numerous body of unfortunates is permitted to scatter broadcast sputum loaded with tubercle-bacilli in every public place, court-room, store, office and street car. It is wrong! There can be no reason why it should be permitted. The very great majority do not know nor believe the harm they are doing; they must be taught, and every true physician cannot but sympathize with every sincere attempt to educate these people in regard to these matters.

One of the first measures in this direction should be the placing of tuberculosis pulmonalis upon the list of contagious diseases, to be reported to Health Board and instructions given patients and their friends as to the measures best calculated for its prevention.

Secondly, heredity plays an important role in the cause of propagation of tuberculosis. The late results of experiments by a number of investigators prove without a doubt the transmission, from parent to offspring, of the disease; *e. g.* Salles *Journ. de Medicine de Bordeaux* 1892, No. 5, p. 52, inoculated a guinea-pig with the spermatic fluid obtained from the seminal vesicles of a tuberculous pig and produced in it a fatal tuberculosis. Sabourand, *La Medicine Moderne*, No. 43, p. 745, 1891, demonstrated tubercle bacilli in the liver and spleen of an infant eleven days old, the mother having died showing lesions of tuberculosis, but genitalia and breasts being free.

Birch-Hirschfeld and Schmore, *Beit. Zur Pathol. Anat. u zur Allgem. Pathol.*, 1891, p. 429; give the death of a woman in seventh month of pregnancy; the fetus was delivered by Cæsarean section, the blood of umbilical vein and umbilical cord showed the presence of tubercle bacilli but lungs showed nothing abnormal, nor bacilli found. A rabbit and two guinea-pigs were inoculated with small bits of liver, spleen and kidney; in all three tubercles were found after times varying from two weeks to three months.

Indeed few if any investigators, but believe that the bacilli can traverse intact epithelium and thus by way of the placenta, may be transmitted from mother to fetus, the question of frequency as to this mode of infection however,, is still an unsettled one. However, knowing that infection does occur in this way, should there not be active measures taken to prevent the marriage of tuberculous patients? And though we may not be able to make use of Dr. W. A. Hammond's "New Substitute for Capital Punishment" in tuberculosis, can we not make such a marriage a crime? Is not the result of such a union more disastrous than the marriage of cousins? And yet many of our states have had wisdom enough to prevent that.

Again, another means of propagation is through the milk, butter and meat supply. Dr. Shakespeare, New York, says "Taking the cattle of all ages and uses, including calves, a low estimate of average percentage of those *visibly* affected with tuberculosis is two per cent., the highest per cent. of diseased is among milch cows and ranges from six to twenty per cent." Chicago consumes in round numbers 150,000 gallons of milk daily, assuming one-tenth of this amount as the probable product of tuberculous cows, gives 15,000 gallons of infected food, if kept separate, but consider the method of delivering, both at the dairy and in the city, and then venture to imagine how much is not contaminated. Think of it; need we look further for external sources of the disease in infants whose principal diet is the milk just as it comes from the wagon or depot?

The flesh also of a tuberculous animal contains the bacillus and it is so tenacious of life that even after salting and curing it can produce tubercular processes in the lower animals, a constant temperature of 160 deg. F. for one-half hour being necessary to destroy it; it is very evident that in milk, butter, cheese and rare meats we must all be brought in contact constantly with active, living tubercle bacilli. This should not be so; protection we should and must have. Our only help can come from legislative action. Have we done our part? Is not our condition directly the result of our own neglect? Can we be serving the best interests of ourselves and humanity by ignoring conditions that through the days, months and years, bring death to thousands? Let the various medical societies of our state and states bring such methods of relief as they deem proper before the legislative bodies and could we not hope for speedy relief?

The protection of the public health, is paramount to all other considerations and with our present knowledge of tuberculosis it is a clear and responsible duty of the profession to make such efforts as will result in much needed legislation. To recapitulate. Three sources of the propagation of tuberculosis, should be promptly shut off.

1st. Those having the disease should, as in Mosaic times, "live without the camp" or under such a regime as will be equivalent. Public health demands surely as much in this as in other contagious diseases. Separate apartments, materials expectorated, as well as objects soiled by them to be immediately disinfected.

2d. Those infected should be prevented from marrying, a physical examination one of the legal requisites of a legal union. Those who are married should be relieved of their procreative powers, a measure, it may be, seems rather harsh and unjust at first thought; but what right has any human being to assume the responsibility of bringing into this world beings previously condemned to lives of torture, ache and woe, a menace to the health and welfare of the community in which they exist and eventually, in a great many cases, a charge upon the charities of the public.

3d. The sources of our meat, milk and butter supply must be under control and inspection. The Bureau of Animal Industry has proven a measure of the greatest importance, but its benefits may be greatly augmented by giving to it individual state assistance. The importance of investigation and inquiry into the condition of animals whose flesh and products are used by man may be realized when we consider that not only millions of dollars are lost annually by the various diseases which can and should be prevented ; but that these diseases may be and are transmitted to man, causing death and such impairment of health and waste of time from sickness that the loss, money value, cannot be estimated. Of what benefit is the result of the wonderful discoveries of modern investigation which have almost startled the world so far-reaching have been their importance, if we do not put the knowledge thus acqulred to practical use? Can we find any needful legislation that so much demands and requires our support and encouragement as that along these lines?

## THE TREATMENT OF CONSUMPTION.

BY ROBERT H. BABCOCK, A. M., M. D.,

**Professor of Clinical Medicine, Diseases of the Chest, and Physical Diagnosis, at the College of Physicians and Surgeons, Chicago. Professor of Clinical Medicine and Physical Diagnosis, at the Post-Graduate Medical School of Chicago. Attending Physician at Cook County Hospital.**

The very fact that an entire evening should be set aside for the discussion by this society of so hackneyed a subject, attests the truth of the proposition that, however much the discovery of the bacillus tuberculosis has done for the etiology and pathology of consumption, we do not yet possess a specific for its treatment. Many able and versatile minds are laboring to that end, and at any hour of the future, as in the past, the profession is likely to be stirred by some announcement which shall arouse fresh hopes as did Bergeon's enemata of sulphuretted hydrogen, Weigert's inhalations of superheated air or even Koch's tuberculin. At the present time Shurley–Gibbes method is being tried widely and with considerable success. But after all is said in favor of this, or of creasote, of guaiacol, or of any other one drug or special mode of treatment, I venture the apparently audacious assertion, that statistics will not show a very much greater percentage of recoveries than is found *post-mortem* in individuals having died of other diseases.

It is an admitted fact that if treatment of pulmonary tuberculosis is to prove successful, it must be begun early. I do not assert that any cherished plan of treatment does not succeed in later stages of the disease; but the rule remains that the prospect of favorable results bears a direct ratio to the promptitude with which treatment follows the onset of the disease. That it is in this early stage that spontaneous arrest is most apt to occur, and that such a spontaneous cure does in fact not infrequently take place, is shown by the *post mortem* observations. Bollinger, cited by Osler, discovered such evidences in 27 per cent., Massini in 39. Although Roger and Bondet, cited by Bennett, gave a still larger percentage of cicatrized tuberculous lesions, and others very much lower, the truth probably lies somewhere near the figures of Bollinger and Massini. Now of 32 cases published by Shurley in the *Therapeutic Gazette* of April and May, 1892, there were thirteen that apparently recovered, a percentage of a fraction over 40.

While at Falkenstein, Germany, where cases of pulmonary consumption in all stages are treated on general hygienic and medicinal principles, at least 24.2 per cent. of arrests is claimed. It is seen, therefore, that these results of professional management do not differ very materially from the figures of Bollinger and Massini. Hence my bold assertion made above that the results of any pet plan of treatment do not vary widely from those of nature unaided by the physician.

Do not conclude, however, that I deny the efficacy, or question the advisability of medical interference in cases of this formidable scourge. By no means! Many individuals are rescued by timely medical treatment who otherwise would perish. I only speak thus to show my lack of faith in any one mode of treatment for all cases.

Unquestionably much good can be done to those who can daily visit the physician's office, or daily command his services for subcutaneous injections of gold and iodine, or of sterilized solutions of creasote, for inhalations of compressed air charged with antiseptic and healing vapors; but there are many thousands more of poor sufferers who cannot avail themselves of such costly advantages, as well as thousands who would only spend their money in such ways to no purpose; and therefore it is for the consideration of the general management of such, that this paper is designed.

Certain fixed principles underlie the general medicinal and hygienic treatment of consumptives, but in carrying out such principles, one should endeavor to avoid falling into a routine plan of management. Of these I believe the first to be, that treatment suited to the early or inflammatory stage, is not appropriate to the stage of softening and excavation. The two chief symptoms at this time as a rule are cough and pyrexia. The former should be allayed if possible, lest bronchial congestion and irritation be increased. To this end mild counter irritation is often very serviceable, preferably by means of small fly blisters below the clavicle of the affected side. I have often been surprised by the prompt relief thus afforded. Phosphate of codeine in half-grain or grain pills thrice daily is most efficient and praiseworthy because devoid of the deleterious properties and disagreeable after-effects of morphine or opium preparations. Bodily exercise should be gentle, all efforts calculated to greatly augment the flow of blood to the lungs must be avoided, since they are likely to intensify the already active inflammation. If the exercise, however mild, be found to increase the fever, it should at once be replaced by physical rest. It will be often observed that the measures addressed to relief of the harrassing cough will also favorably influence the body temperature. Should such however, not be the case, the dietary should be regulated in accordance with the rules governing that of any other form of continued fever; viz., liquid and moderately nitrogenous food, of which milk is the best. At the same time mild saline laxatives and gastro-intestinal antiseptics, as carefully purified dried ox gall and salophen, as well as dilute hydrochloric acid, may be administered to prevent as far as possible fermentation within the digestive tract. For the intestinal irritation thus produced, as well as the products of fermentation, undoubtedly play an accessory role in maintaining the pyrexia. Should the temperature average high, nevertheless, antipyretic measures are in order, and of these I prefer careful spongings with warm water.

It is a mistake, I think, at this time to order cod-liver oil and the like. It is not well borne as a rule, and serves but to disorder the digestion and disgust the patient. Neither, likewise, should iron be given, since it is quite sure to intensify the fever. Quinine may be administered in tonic doses, but if employed in antipyretic doses, it is likely to derange the stomach and aggravate the cough. Salicylic acid is less objectionable, I think, in the early stage.

Strychnine and arsenious acid are in my opinion very useful tonics, and if the pulse be very rapid and feeble, I advise whisky in moderate amounts.

In those cases in which symptoms are less pronounced, less stringent treatment is required. It is in these cases particularly, I believe, that creasote is indicated. Indeed it is for the treatment of incipient phthisis particularly that Somerbrodt recommends this remedy in as large doses as the patient can be made to tolerate. Finally, it is for individuals in the early stage that I especially advise a change of climate. And here it should be said, it is just in these cases of beginning disease that a choice of climate is most difficult, since an unwise and hasty selection may prove more disastrous than a stay at home. This, however, is a part of our subject which the time at my disposal compels me to leave for another occasion. I will only remark that the more pronounced the constitutional disturbance, the less suitable is a high altitude, as a rule.

Cases characterized by continuous and high fever from the start present an unfavorable prognosis at the best, and are but too apt to resist all efforts put forth in their behalf. A large percentage of them manifest early and pronounced digestive derangement both of secretion and absorption. This renders the problem of maintaining nutrition a most difficult one. If stomachics, such as a bitter alkaline mixture containing nux vomica, do not revive the appetite, resort had better be had to lavage of the stomach. By this simple procedure I have seen more than one patient become able to consume and digest amounts of food which before was a physical impossibility.

In the stage of softening the management should be founded on other principles. Now, unless the cough be so severe and paroxysmal as to cause vomiting and exhaustion, it should not be greatly interfered with. A dose of codeine may be administered at bedtime to promote sleep, but in the morning and during the day the cough should be rather encouraged and the expectoration facilitated by means of hot drinks and appropriate inhalations, since the retention of the sputa serves but to increase the phenomena of sepsis due to absorption. Expectorants in the form of cough syrups are to be condemned, particularly if they contain preparations of opium. Besides obtunding the patient's sensibility to the presence in the bronchi of irritating products, they impair still further the already feeble appetite and digestion. I order instead a simple perforated zinc respirator, on the sponge of which are dropped ten to twenty drops of some sedative and antiseptic solution. The one I usually prescribe contains a drachm each of ethereal tincture of iodine, strong carbolic acid and oil of bitter almonds in enough spirits of chloroform to make up an ounce. Upon becoming accustomed to the respirator charged with such a solution, the patient is generally able to wear it for an hour or more with decided ease and comfort. Should the cough be very urgent and intractible, the pharynx and larynx had better be carefully inspected, as the source of the trouble is not infrequently found to reside in these parts. In such instances, of course, local treatment is necessary.

Other symptoms requiring attention are those due to sepsis, the so-called phenomena of hectic; these are chills, fever and sweating. Often the pyrexia, which subsides in a few hours, does not require special treatment, but in case it does call for some means for its mitigation, I first try the efficacy of plenty of fresh air, rest and liquid nourishment during the height of the pyrexia. This failing, inhalations of oxygen combined with nitrogen monoxide in the proportion of 20 or even 40 per cent. are ordered. These are sometimes followed by gratifying results. Should these also prove ineffectual, recourse is had to careful spongings or to small doses of phenacetin, etc. Of all measures at this stage, however, I am convinced that nothing excels plenty of fresh, cool air. At Falkenstein consumptives are kept out on the open verandas from 8 a. m. to 10 p. m. No matter what the weather, they are kept thus out of doors, sufficiently wrapped up in bed or easy chairs to maintain warmth of the body and protected from the rain or snow only by canvas curtains. In this way they are supplied with an abundance of pure air, and the results obtained by this, combined with proper alimentation, speak for themselves in a percentage of recoveries of from 24.2 to 27 per cent.

If my patients seek another climate at this time, I insist on prolonged daily sojourn in the open air; if they stay at home, fresh air is constantly admitted through an open window either in an adjoining room, or, if in the same apartment, so screened that the patient will not be exposed to direct draught. Nothing can be worse for the consumptive than the hot, ill-ventilated room in which he is so frequently confined. Is it any wonder he wastes away with fever and loathes food?

Of all remedies for sweating, I prefer picrotoxine in doses of a sixtieth or a fortieth of a grain. I have never observed ill effects, and it often proves effectual for two or three days. It should be taken an hour or two before the expected sweating. I long ago abandoned atropine for this purpose.

The great aim of our treatment should be to maintain and if possible to improve the nutrition. That this is absolutely indispensable to retardation of, or recovery from, this pulmonary disease has been abundantly proven by experimentation and clinical experience. But, unfortunately, our efforts are only too often frustrated by digestive derangements. Repugnance to food and indigestion are present in a large percentage of all cases. According to Ewald, this condition obtained in 84 per cent. of the severe cases analyzed by Brieger. Whereas, "in moderately severe cases the gastric juice was normal in only 33 per cent. In the remainder its strength varied, the disturbance being, as a rule, well marked; while in 6.6 per cent the normal secretory products were absolutely lacking. In the initial stages the cases of normal and disturbed secretion were about equally divided." Not only is secretion disturbed, but absorption and peristalsis are also impaired. Moreover, a not inconsiderable proportion of consumptives manifest dyspeptic symptoms before those referable to the lungs call attention to the real seat of the mischief. It would appear, furthermore, that the gastric derangement is due, primarily to passive congestion, leading to chronic catarrh, although true dilation of the stomach of phthisical patients has occasionally been observed. Recognizing, therefore, that the sufferer's inability to take food is not imaginary and due to whim, but depends upon chemical and mechanical disturbances which prevent the inadequate digestion of nourishment when once taken, what are we to do? Manifestly we should manage these cases in the same way we would individuals without pulminary complaints, but with chronic gastritis. That is, lavage should be instituted, gastro-intestinal antiseptics administered and a suitable regimen prescribed. For the repair of tissue waste going forward so rapidly large amounts of nitrogenous food are indicated. Yet just here we are met by the following difficulties : Owing to the diminution, if not absence, of free hydrochloric acid, or to other coincident changes, the stomach is not able to properly digest albuminoids, and they tend to undergo putrefactive fermentation, which condition is furthered, not checked, by probable alterations in the pancreatic, intestinal and hepatic secretions. Moreover, plenty of oxygen is required for the process of oxidation so necessary to a successful utilization of a chiefly nitrogenous diet. This consumptive patients are not usually able to get, partly through physical weakness and partly because of diminished respiratory capacity. Hence we but too often witness an aggravation of the gastric and intestinal symptoms, such as the heavily-coated tongue, nausea and diarrhœa. Do not content yourself with vague directions as to a hearty dietary of plain, easily-digested food, but resort to those active measures and that practical meditation already mentioned. Then, if after your most faithful efforts you cannot improve the difficulty, turn to liquid and peptonized foods which require little further elaboration, but mainly absorption, and which by their concentration provide the greatest possible nourishment in the least possible bulk. Of these I find Mosquera's beef meal and beef meal cocoa, imported by Parke, Davis & Co., the best. Peptonized milk and meat juices are also valuable. If solid food can be tolerated at all it will be during those hours when the body temperature is low, and not during the p. m. pyrexia.

Tonics, as strychnine and arsenic, are valuable, as well as the hppophosphites, malt extracts, etc. I do not prescribe iron, since I do not believe it is well borne and assimilated. When a patient can take cod-liver oil without impairment of the appetite and digestion thereby, I prescribe it in such doses as are absorbed, and by preference of the pure oil with whisky, maltine,etc. Many of the emulsions are said not to contain pure oil, but my patients report favorably of Morse's cream, Matzol and Trommer's oil and malt emulsion. I do not approve of those substitutes that contain vegetable oils, since it is well established that animal oils are the most readily absorbed by the animal economy. Probably the best substitute for cod-liver oil is cream and good fresh butter.

If constipation or much intestinal fermentation exist, I relieve the former by copious warm water enemata and the latter by carefully purified dried ox gall, combined usually with salophen, or benzo-naphthol in capsules.

I have trespassed upon your patience, and, therefore, will not attempt to enter any further into details of this plan of management, which perhaps some of you are characterizing as "old-fashioned and worn-out." I have no objection to the adoption of any other—the injection of dog's serum, or what-not, if you prefer. But of one thing I am assured: If, in addition, your patients are managed on this general plan their improvement will be the faster, and without it some of them will assuredly disappoint you.—*The North American Practitioner*.

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## IS IT PROFESSIONAL TO ADVERTISE.

### SOME SUPERANNUATED QUESTIONS ANSWERED.

Neither do men light a candle and put it under a bushel, but on a candlestick, and it gives light to all that are in the house.—*Matt. 5:15*.

This is not only scriptural and moral doctrine, but the experience of men in ages has found it to be sound, practical common sense.

Advertising is admitted by all intelligent people as a necessity for the advancement of knowledge, civilization, religion and business. The merchant does not sit in his store supinely waiting for customers; he takes the means of informing them of what he has for sale. Railroads do not wait till the traveler finds out from others that the road is in existence; they advertise their road and its facilities, and the public patronize them. Churches and church societies use every means of informing the people of their aims and objects, and the printing press has been a most wonderful power for good in their hands. Hence, the farmer knows where to purchase seeds and agricultural implements to the best advantage; the family knows where dry goods and the best groceries are kept. The parent knows what institution of learning is best adapted for the bent of his children's capacity; the traveler knows what road to take for his desired destination; all this is conceded to be perfectly proper. But from all directions is heard the cry of some members of the dental profession, who say you must not know through advertising where to go and find relief or benefit.

Thus every dentist who has strength enough in his convictions, and stands forth and tells in common sense and plain English of the methods used in "Modern Dentistry," under which we include filling teeth without pain, extracting teeth with local anaesthetics, and inserting by crown and bridge method, will at once be denounced as a charlatan and a fraud. But is he? "Crown-and-bridge-work is a triumph of the 19th century," so says our esteemed editor, Dr. Welch. It is surprising how few people outside of the dental profession know of such a method of restoring the teeth to their natural functions, thereby alleviating a vast amount of pains and the avoidance of wearing a cumbersome, treacherous plate.

Is the merchant a "humbug" and a quack because he advertises? Are railroads, church societies, institutions of learning, schools and colleges, manufactories, managed by "charlatans" and superintended by "mountebanks" because they advertise their respective business to the people? Oh, no! perish the thought; and yet, professional brethren, answer my question: Can you give one good, sound, plain, practical, common sense reason why the reputable dentist, fitted by years of experience and education, should not make known his business to the public by the only way in which he can make the benefits of his knowledge reach the greatest number, and thereby do the greatest good to himself and a vast number of intelligent people?—*Items of Interest.*

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REORGANIZED.—The trustees of the Dental Department of of the Cincinnati College of Medicine and Surgery have appointed Drs. J. R. Callahan, M. H. Fletcher and O. N. Heise to succeed Drs. Junkerman, McLean and Buxbaum. The dental department will be thoroughly reorganized and put on the highest plane possible. The trustees could have made no better selection and with Dr. J. R. Callahan as Dean, there will, in the future, be no cause to question the standing of this college.

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Subscribe for THE DENTAL AND SURGICAL MICROCOSM.

# THE DEVITALIZATION OF THE DENTAL PULP.

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BY W. D. MILLER, M. D. PH. D., BERLIN, GERMANY.

The devitalization of the dental pulp has frequently been made the subject of communications to the dental journals, and of discussions in dental societies. Expression has often been given to the general complaint that application of arsenic to the dental pulp is too frequently followed by severe pain, and various means have been suggested for rendering that operation less trying to the patient.

My experience in the devitalization of pulps differs somewhat from that of many writers on the subject, in that I am able to perform the operation without pain ; at least I have not had a single case in the last two years in which the patient has complained of severe pain after the application of arsenic, and in nearly all cases they have said they had felt nothing whatever. A description of the manner in which I devitalize pulps may, therefore, be of service to some of the readers of the *D. & S. Microcosm*. Not that I employ different materials from anyone else, or use different methods, but I certainly do accomplish the result without pain.

With occasional exceptions, I adjust the rubber dam where arsenic is to be applied, then bathe the cavity thoroughly with carbolic acid, and remove the decayed dentine as thoroughly as possible without producing unnecessary pain. I find it desirable, as others do, to have a large surface of exposure to which to apply the arsenic, but I apply it to a small exposure rather than give the patient pain in the attempt to enlarge it. I now place two or three drops of carbolic acid upon a glass slab, and add as much of the hydrochlorate of cocaine as it will dissolve. A pledget of cotton, supersaturated with this solution, is placed in the cavity and left there while I am preparing the paste. I have in a small bottle a preparation consisting of equal parts of acidum arsenicosum and morphinum muriaticum, with just enough carbolic acid to hold them together (not to make a paste). I take a bit of this a little larger than a pinhead, and make a paste of it with the saturated solution of cocaine in carbolic acid. I now remove the pledget of cotton from the cavity, take the paste from the point of a suitably shaped excavator, and apply it directly to the point of exposure. Over this I place a small, flat pledget of cotton, well saturated with cocaine-carbolic acid solution, being careful not to let the cotton extend over the margin anywhere, and avoiding every trace of pressure.

As far as the action of the cocaine is concerned, I have no doubt the same result may be obtained by incorporating the crystals with the ordinary thin arsenic paste usually employed. So far as I know, the following formula, which has been repeatedly recommended; would serve the same purpose.

R Acidi Arsenicosi........................
Cocaine Hydrochlorate...........aa, 0 5
Acidi Carbolici, q. s....................

Personally, I have always used the fresh crystals of cocaine.

Now comes a very important part of the operation, that of retaining the application in position. If I had my enemy in the chair, and wished to make him atone in one night for all the sins he had ever committed, I would take some cotton, roll it up into a hard ball, saturate it with sandarac varnish, and force it into the cavity. The use of cotton and sandarac for retaining applications to the pulp appears to me to be utterly inexcusable. I think that one would be justified in calling it not only irrational, but a slovenly practice. More or less pressure is absolutely necessary to make the cotton stay in place, and this is sure to increase the probability of pain in a high degree, to say nothing of the danger of causing minute quantities of the arsenic to exude and come into contact with the gums, while the cotton itself, unless packed very tight, soon becomes permeated with the secretions of the mouth.

The method of covering applications to the pulp with gutta-percha has always appeared to me very objectionable, simply because it is next to impossible to cover the bottom of a cavity with a pledget of cotton, supersaturated as it should be with some local anæsthetic, and then fill over this cotton, wet with gutta-percha solution, so as to obtain anything like a watertight filling, without exerting pressure upon the cotton. For all cases where we have to enclose applications on cotton, the oxysulphate of zinc is vastly superior to gutta percha. I use the preparation known as Fletcher's artificial dentine, but am not acquainted with preparations of a similar character which may be on the American market. I mix the preparation moderately thin, so that when it is taken upon the spatula it hangs down slightly. It should not, however, be thin enough to drop off. For inserting it, I use in most cases a very thin sickle-shaped spatula. Taking a small quantity upon the end of the spatula I draw it across the margin of the cavity, just about as one draws a plaster knife across the edge ot a board to wipe the plaster off. I thereby fix the cotton on one margin ; then in the same manner it is covered on the opposite margin, eventually a third or fourth portion being necessary to complete the operation. For approximal cavities in molars, an instrument bent upon its surface will sometimes be found preferable to a sickle-shaped one. The method of applying the cement is also somewhat different for molars, but a little experience will soon make the manner of manipulation apparent to every one. Like everything else, it requires some practice.

With the oxysulphate, or even with plaster of Paris, one can place a wet pledget of cotton in the open end of a tube ¼ inch in diameter, and fill over it without displacing the cotton, or exerting the least perceptible pressure upon it, a thing which cannot be done with gutta-percha, or any other material that I know of. My manner of applying arsenic was put to a severe test a few days ago in two quite similar cases, one of which I may relate. A middle-aged gentleman, of nervous temperament, presented himself, with an aching tooth on the right side of the upper jaw. An examination revealed a second molar, decayed on the distal surface. The cavity contained a pledget of cotton, the removal of which was followed by a paroxysm of severe pain, and a drop of pus was seen to exude from the point of exposure of the pulp. I make it a rule never to apply arsenic to an aching or highly inflamed pulp, but in this case for special reasons, I decided to deviate from the rule. I at once inserted a pledget of cotton, saturated with the cocaine-carbolic acid solution, which was allowed to remain about five minutes, the pain gradually diminishing in intensity ; I then asked the patient to rinse his mouth (not a necessary part of the procedure, however,) and renewed the application, which I left in the cavity while I was preparing the arsenic paste. The latter was applied as described above. When I had finished, there was still some grumbling pain, which disappeared gradually and entirely inside of ten minutes, and the patient did not have a trace of pain afterwards. The pulp could be extirpated on the following day. Thus the application of arsenic was made the means of completely stilling the pain, instead of producing the violent suffering so often complained of. In another case, two days ago, a young lady came to me with an aching tooth which had troubled her more or less every day for weeks. It was so sensitive that the touch of the finger, unless quite warm, produced severe pain. I applied arsenic with my usual care, and from the moment she left my office she felt nothing whatever to remind her that she had a decayed tooth.

I attribute my success in this operation to the observance of the greatest possible delicacy in making the application to the pulp, in particular to the avoidance of every trace of pressure, and secondly to the maintenance of a constant anæsthetic condition by use of the cocaine-carbolic solution.

## ADVANTAGES OF NITRATE OF SILVER IN DENTAL PRACTICE.

In presenting something of my personal experience in the use of nitrate of silver in the treatment of diseases of the teeth, it is with the hope that as the subject has been recently discussed in dental societies, by reason of the able papers of Dr. Stebbins, it has not become threadbare, and something of interest will be found in its consideration. The character and scope of the discussions that I have read on the use of nitrate of silver for the treatment of diseased teeth, have been such as to impress me with the belief that its benefits for such use are not generally understood and appreciated.

Nitrate of silver is conceded to rank as one of the most efficient and reliable remedies in medicine and surgery, and when its merits are fully known it is believed that it will be found equally efficient in the treatment of a large class of diseases of the teeth.

Take for instance decay in temporary teeth. We all know from individual experience how trying it often is to fill the teeth of small children in the ordinary way of making such operation; how they resist all efforts to excavate and fill sensitive cavities. By the use of nitrate of silver the operations are more easily made. Take approximal cavities in the posterior teeth, where the child is not too fearful and timid; cut away the walls to a V-shape, and with a piece of gutta-percha, softened by heat, of the proper size to fill the space, bring the surface to come in contact with the diseased part of the teeth in contact with powdered crystal of nitrate of silver, and carry it to the place in the tooth or teeth prepared for its reception, packing it firmly and leaving it there to be worn away by use in mastication; when that takes place, the surface of the teeth treated will be found black and hard, with no sensitivenes to the touch or to change of temperature, and they will remain so indefinitely. In case the child is so timid and fearful as to prevent this course, dry the cavity, take out such softened dentine as the patient will permit, carry the crystal on softened gutta percha into the cavity and pack it, leaving it until such time as desirable to replace it with a more thorough operation. On removal of this filling the dentine will usually be found hard without sensitiveness, and needing but little excavation for the final filling.

I have treated diseased pulps with the nitrate of silver crystal very frequently since early in my practice, especially in temporary teeth, where devitalizing pulps with arsenious acid is unsafe, applying the crystal direct to the exposed pulp, usually with relief to the patient.

Nitrate of silver is a resolute remedy; it cauterizes the surface of the soft tissues to which it is applied, but does not penetrate them as does carbolic acid, nor does it involve the entire pulp in an inflammatory process, tending to destroy the whole mass, as does arsenious acid.

In case of extreme sensitiveness about the necks of the teeth at the margin of the gums, where the tendency is to softening of the tissues of the tooth, a condition very annoying to patient and troublesome to the dentist, nitrate of silver has proved more successful with me than any other remedy in checking the progress of the disease and relieving the patient. The salt may be applied directly to the sensitive part without pain to the patient. A good method that I have practiced is to cover the parts after the nitrate is applied, with a phosphate filling-material of a cream-like consistence. That hardens, and prevents the washing away of the remedy and the surrounding parts from coming in contact with the salt.

Erosion or wasting of the teeth is checked more perfectly by nitrate of silver than by any other remedy that I have ever used. The salt is applied to the affected parts, and covered with a phosphate filling to protect and retain it in place until it is firmly established in the dentine. In cases where the progress of the disease has gone so far as to require restoration by filling, this preliminary treatment is very beneficial in preventing a further waste of the tooth-substance and consequent failure of the operation.

In cases of superficial decay in soft teeth, where dark surfaces are not objectionable, nitrate of silver is very beneficial. By removing the softened portion of the tooth, polishing the surface, and rubbing the salt into the dentine, using a warm burnisher, and varnishing the parts to protect and hold the remedy until taken into the organic matter of the tooth, you will have a dense, hard surface, free from sensitiveness in mastication or change of temperature. In filling cavities in this class of teeth having a excess of organic matter, with which there is so much trouble from chemical or electro-chemical action between the walls of the cavity and the filling, an application of nitrate of silver to the walls of the cavity will effectually prevent these unfavorable results. The remedy is taken up by the dentine penetrating the surface sufficiently to prevent any such action between filling and tooth. This treatment will at all times result in a darkish hue to the walls of the cavity about the filling. This I explain to the patients, that they may know that it results from the treatment and that it is a proper and favorable condition for permanency of the operation. Also in crown and bridges where the dentine is uncovered, it is beneficial to use this remedy on the teeth and roots used to sustain the bridge or crown, as a protection against thermal change and decay. The use of nitrate of silver may be varied by applying the rubber-dam and using a strong solution of the salt, and evaporating the moisture by use of a hot-air syringe. When used in this way, a solution of soda can be applied to the parts to neutralize any acid remaining. In the class of cavities extending so far beneath the soft tissues as to render the use of the rubber-dam or matrix impracticable, and a leakage of the surrounding tissues is liable to enter the cavity while introducing the filling, and injure the permanency of the operation, cauterizing these tissues thoroughly with nitrate of silver will effectually prevent such result.

After the diseased sockets and the deposit from the roots of the teeth are removed, nitrate of silver has proved more successful in restoring a healthy condition of the parts than any other remedy that I have used in the treatment of pyorrhea. The finely pulverized crystals may be applied to the diseased parts by the use of a small spatula of wood or of platinum ; by slightly dampening the end of the instrument and applying it to the salts, it will adhere sufficiently, and is easily placed in the space between the gums and the roots of the teeth. After the remedy has been a few moments in contact with the part, it is best to rinse it with water by the use of a syringe.

In extirpation of pulps, where the pulp-canal is sensitive at or near the apex of the root, nitrate of silver crystal carried to the the sensitive part and left there for a few hours usually relieves the trouble, and the canal can be filled without pain or danger of unfavorable results.

These are some of the many uses where nitrate of silver is advantageous in dental practice. Nitrate of silver is a powerful remedy. It acts promptly, with great uniformity, and leaves its track in darkened surfaces when applied to the teeth. This should be considered, and its use governed accordingly—HOLMES (A. M.) *Dental Cosmos.*

## SUDDUTH AND DENTAL ETHICS.

We do not generally take notice of cases wherein violation of the code of ethics of a society is a question. But there is being enacted in Minneapolis a farce that is somewhat ludicrous and deserves some notice, especially in view of the fact that our own views on the topic of advertising, the code of ethics and kindred subjects have been materially changed since we have ventured into the publication of a newspaper. The Dental Department of the University of Minnesota, it seems, has received some advertising in the public press of that city. The Minneapolis Dental Society has tried several dentists connected with the school, and all except the Dean, Dr. W. Xavier Sudduth, were exonerated. Last Saturday was set for the trial of the culprit, the following is the report:

The proceedings were opened last evening by the placing of Mrs. J. W. Withrow, President Cyrus Northrop, of the State University, and Dr. F. B. Kremer on the witness stand in behalf of the defence, following which Dr. Sudduth took the stand in his own behalf, and after answering a number of questions, proceeded to a lengthy summing up of his case, in which he explained the incidents relating to the "write up," claiming that he had done nothing wrong and nothing tending to violate the "code of ethics."

He related incidents of "write ups" of members of the dental profession in daily papers of which nothing was thought, and which did a great deal more "puffing up" than was ever possible to be imagined in the "write up" of the dental department of the State University.

Dr. Jewett made a motion as follows: "I move to dismiss on the grounds that the charges have not been sustained." The motion was voted down. Then a *coup d'etat* was executed. The deputy sheriff pushed the door open and entered the room, pulling the documents out of his pocket, and began to pass them around.

The members viewed the injunction, and were some little time in arriving at a correct conception of the true import of the document. "I move we adjourn," shouted one member, and, without more ado, they adjourned.

Dr. Sudduth explained that the course adopted by him was one to which he had been driven by members of the society, who denied him even the privileges of a criminal at the bar. His professional reputation was all he had, and he proposed to defend it against such slurs—with his life, if need be. The matter would now go into court, and if the court found that the members had acted in accordance with the law, it would again revert to the society, but if not, it will probably be tried in the courts.

The title of the action is "W. X. Sudduth *vs*. The Minneapolis Dental Society; E. T. Clark, L. D. Leonard, H. L. Wilkins, constituting the trial board of said society; F. E. Hansen, president of said society, E. H. Angle and other members of the society," and the complaint sets forth the facts already made public, relating to the publication of the article in question; the plaintiff's professional reputation; its value to him and the time spent in acquiring it, and then goes on to relate the incidents of the accusation against Dr. Sudduth and the trial by the society, and on the grounds mentioned. Judge Hicks issued the restraining order, putting a stop to all further procedure with the case till it could be heard in the court.—*Dental Tribune, April 8.*

## HOFF (N. S.) ON LOCAL ANÆSTHESIA.

Cocaine alone is best used in a two per cent solution in local anæsthesia. The addition of carbolic acid to the distilled water, helps to render the solution antiseptic and also limits the absorption of the cocaine into the general circulation, thereby localizing its action. If higher percentage solutions are used, some agents which will counteract the paralyzing effect of the cocaine on the heart and respiration should be added. The most effective agent of this kind is the sulphate of atropine. This is a valuable addition to the formula, not only for its antagonistic effect, but it also increases the local effect by paralyzing the nerve endings in the tissues involved.

In order therefore to construct a formula which will meet the demands of anæsthesia and be safe to use, four elements at least are necessary, viz: the basis, the adjuvant, the corrective, the diluent. And as an illustration, we will compound the following formula, making a two per cent. solution of cocaine:—

| | | |
|---|---|---|
| R | Cocaine Hydrochlorate, | gr. x |
| | Sulphate of Atropine, | gr. 1–10 |
| | Carbolic Acid, 95 per cent. solution, | gtts viij |
| | Distilled Water, | dr. j |

Dissolve carbolic acid and atropine in the water and to every twenty-five drops add one-half grain of cocaine. When wanted for use, other drugs may be added to this formula to increase or intensify the effect of cocaine, but in my judgment chloral, camphor and aconite, which are usually employed, do not materially increase the power of the formula, while it is quite certain that they do cause an excessive irritation that is somewhat difficult to control. Chloral is especially apt to cause this irritation, and in some cases it will produce excessive swelling or even sloughing of the gums. To increase the power of the formula, I should prefer rather to increase the amount of cocaine up to a three or four per cent. solution. The amount of this formula that can be safely used at one time can be determined by remembering that one-half grain of cocaine is a safe dose for a hypodermic injection, and that $\frac{1}{200}$ to $\frac{1}{60}$ of a grain of atropine can be safely injected. And since the atropine and cocaine neutralize each other in their physiological actions, a dose of each given at the same time must be safe. The carbolic acid in the quantity indicated is not at all dangerous, and consequently we would be justified in using hypodermically twenty-five drops of the above solution. But practically it will not generally be necessary to use more than ten or fifteen drops, unless a great many teeth are to be extracted. This formula is selected only as a basis or a study as it were, but it will be found useful in its present form. It is hoped, however, that this subject will be investigated both clinically and scientifically.—*Extract Dental Register.*

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BUREAU OF INFORMATION AND SERVICE ESTABLISHED.—At a meeting of the Joint Committee of the Chicago Medical Profession on World's Fair Entertainment, held at the Sherman House, November, 1892, the establishment of a Bureau of Information and service was delegated with approval and endorsement to Chas. Truax, Greene & Co., the committee reserving to itself the duty of such social entertainment of visiting physicians during the continuance of the Exposition as may seem desirable.

This action was confirmed at the final meeting of the Joint Committee, February 25, 1893, and on the application of the Practitioner's Club and the South Side Medical Club, the matter of social entertainment was delegated to them, with full authority to act in the capacity of entertaining bodies, with the retention of the chairman and its American and foreign secretaries already appointed. Chairman, Dr. Chas. Warrington Earle; American Secretaries, Dr. Archibald Church, Dr. Geo. Henry Cleveland, Dr. John C. Cook, Dr. J. C. Culbertson; British, Dr. Sanger Brown; German, Dr. F. C. Hotz; French, Dr. Fernand Henrotin; Spanish, Dr. E. J. Gardiner; Italian, Dr. A. Lagario; Swedish, Dr. K. Sandberg; Canadian, Dr. R. D. McArthur.

The scope and duties of the above secretaries will be designated in the future.

C. WARRINGTON EARLE, *Chairman.*

# THE DENTAL AND SURGICAL MICROCOSM.

A QUARTERLY MAGAZINE.

CONTROLLING EDITOR, - - - - - - - - - - SAMUEL J. HAYES
ASSOCIATE EDITOR, - - - - - - - - - - FREDERICK GAERTNER

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## EDITORIAL REVIEW.

THE first two articles in this number of the *D. & S. Microcosm*, deserve the earnest attention of every reader of the journal, as in these two addresses will be found explained and exemplified, the two forces compromitted in the production of anæsthesia or hypnotism, as properly understood.

The interruption of the neural currents in the sensory nerves, and the disconnection of spirit force with material force by any and every means concerns every student of the art and science of anæsthesia.

As anæsthesia, properly and correctly speaking, can only be produced by conveying the mind, or spirit force beyond the reach of material force, or by preventing material force from reaching the mind. The how these disassociations are brought about is worth knowing in laying the foundation for the superstructure of anæsthesia.

First, then, let it be borne constantly in mind that in both the spiritual and material worlds there are but two forces, spirit and material, and that spirit can only manifest itself to this material world through material force. Spirit or mind cannot move matters only as it does it by operating upon and through material force. Neither can spirit or mind be operated upon or effected by matter only, as it is accomplished by matter operating upon and through material force. Therefore, the study of the forces of life, and how primarily effected, is of paramount importance in the study of this much neglected art and science.

Anæsthesia and hypnotism are words fitly expressive of the same physical condition. Though as commonly understood, hypnotism refers also to the agency producing the condition, and is recognized as the same physical condition as is denominated anæsthesia in the various degrees or stages.

But it should be borne in mind that "a hypnotic is any agency that has a tendency to produce artificial sleep." Sleep is brought about by causing a cessation of activity between the two forces. Spirit or mind force ordinarily predominates and operates upon and through material force to effect matter. But the mind or spirit may be operated upon and effected by material force, which force may be brought to bear by another mind operating upon material force directing it upon the mind through the agency of what Dr. Doolittle is pleased to term fluidic force, but which would perhaps be better comprehended by the term electricity. In this electricity what is termed positive and negative, has reference to polarity. All fluidic elements seek an equilibrium. Hence, the fluidic or electric activity may be directed and controlled by mental activity or spirit force. Therefore, some persons have more power in directing and controlling this fluidic force than others, and consequently, can control other minds more readily and thus *mesmerize*, *hypnotize* or *anaesthetize* a greater number of persons, and with much less effort than others. But success will depend largely upon the positive mental activity of the hypnotizer. The mind of the hypnotizer, may be termed the internal hypnotic. But the same individual may use an external hypnotic or anæsthetic to aid him in bringing about the desired hypnotism or anæsthesia and ordinarily he will obtain the desired results in about one-half the time that he would if he used alone either the internal or external agency.

Prof. Davis, in his very excellent lecture, teaches the importance of securing an acquiescent condition of mind.

Mesmer taught the same science.

Burnheim and others of equal note teach the absolute importance of securing this condition of mind preparatory to the production of hypnotism or anæsthesia. Having once secured this condition of mind, the subject can be readily operated upon either by the mind of another, or by an external hypnotic or anæsthetic, or much better and much more effective by both the internal hypnotic or mind, and the external hypnotic or anæsthetic.

The force of what is here stated may be recognized more readily when the reader reflects upon the numerous subjects that he has anæsthetized. How difficult it has always been to secure the desired results when the patient did not acquiesce, or was afraid of being hurt, and how readily the patient yielded and was anæsthetized when the patient acquiesced and desired the results, and believed that profound sleep would be produced.

Then let it be borne in mind that every person possesses more or less of this hypnotic power, and that it should be properly used in producing hypnotism or anæsthesia.

Dr. Hamilton, of New York, states that he can hypnotize three-fourths of humanity by his mind, so that any surgical operation can be performed. Dr. Dana, of Europe, makes a similar statement of himself. But if you have not this great potency of mind to influence and control the electric current and thus the mind of others, do what you can by first securing that acquiessent condition of mind on the part of your patient, and then directing your own mental activity in connection with an appropriate external hypnotic or anæsthetic, and you will secure satisfactory results.

Therefore these two forces should be thoroughly studied in their relations to each other, and skill acquired in directing and controlling them.

Hence the importance of teaching in the art and science of anæsthesia, the potency and relation of these vital forces, how influenced and controlled to bring about the desired condition of anæsthesia for painless operations in dentistry and surgery.

## SOUTH CAROLINA STATE DENTAL ASSOCIATION.

The Twenty-third Annual Meeting of the South Carolina State Dental Association will be held in Columbia, Tuesday, August 8, 1893, continuing four days. All members of the profession are cordially invited to be present.

CHAS. S. PATRICK, *President.*
B. RUTLEDGE, *Recording Secretary.*

## DIED IN A DENTIST'S CHAIR.

HARRISBURG, May 24.—Mrs. Sarah Radel, 40 years old, of Waynesville, Dauphin county, died suddenly yesterday afternoon at the office of the Albany dentists, this city. Dr. T. J. Dashiell administered vitalized air to the lady preparatory to having a number of teeth extracted. A verdict was rendered by the coroner's jury that the unfortunate result was purely accidental, as the lady had taken the air before successfully and the doctor had been using the treatment for three years successfully.—*Exchange.*

What a sad comment on the intelligenee of a jury to announce that the death was purely accidental. But what caused the accident? There is never a result without a cause. What was the cause of this result, this accident or death? The mission of the jury, if it had a mission at all, was, if possible, to ascertain the cause of the death and not simply to announce the result. In the rendering of the verdict the jury attempted to argue that there was no cause of death, "as the lady had taken the air before successfully and the doctor had been using the treatment for three years successfully." Whoever heard of a result without a cause?

The question here naturally arises how came about the selection of such an *intelligent coroner's jury?* It would seem as though the jury was picked for a specific purpose. Could interested parties have had anything to do with "fixing the jury."

If nitrous oxide gas, when administered without the admission of air, can only produce asphyxia, and if continued, *death*, and if death was the immediate result of the administration of this gas, then there can be no doubt that the exclusive and continued administration of nitrous oxide gas caused the death of the patient. But will you find in any of the other dental journals any statement of this death or of the death at Rochester, N. Y., published in our last issue, or of the death that occurred in Pittsburg, Dec. 30, 1892, all from nitrous oxide gas? Why not? Simply because if published it would kill the sale of nitrous oxide gas and the various gas apparatuses. The publishers of all these dental journals are either directly or indirectly interested in the sale and will not injure their business. And yet dentists will go to their dealers for statistics and death rates, etc.

THE SCHOOL OF ANÆSTHESIA, of Chicago, Ill., the first school instituted to teach the art and science of anæsthesia—so far as is known—has already made commendable progress both in classifying the instructions and in the actual work of teaching. Like every other new enterprise, it has its enemies, who have not only shown a willingness to criticise, but to actually misrepresent not only the character of the school, but the motives of the originators of this commendable enterprise. Of course every man is entitled to his own opinions about any and every thing, and is in this free country privileged to express the same, so long as he does not throw himself within the clutches of the law, and even then he may escape the penalty for want of disposition to disturb him in his infatuations. But this opposition arises merely from a class of men who do not recognize the importance of a special school to teach this specialty, as they themselves are not overburdened with a proper knowledge of this science, and thus can never see how any good thing can come to light or prove a blessing to mankind except they have the honor of originating the same, and are among the honored of the enterprise.

Yet the school has its friends among the honored of both the medical and dental professions, and the school has a faculty worthy the character and object of the college. And this school has already put a very respectable class from both professions through a course of instruction and conferred the degree of M. S. A. upon ten of its members. The school will be open and in progress during the entire time of the World's Fair, and a new course of lectures will begin about the first of each calendar month. Students can enter at any time, but it is better to commence first of the course of lectures.

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THE delay in the appearance of the Dental and Surgical Microcosm for July has been caused by the serious and protracted illness of Will W. Hayes, D. D. S., only son of the Controlling Editor of the Journal, at whose bedside the father gave his last and best services and mingled his sorrows to soothe the fading flickering life of his beloved. Never before in all his life did he find it such a difficult task to fulfill his duties as an Editor, as in the work of getting out this July number and trust that the mantle of charity and forbearance be extended for the manifest want and defects in the present number.

It is not a sad comment upon the wisdom and intelligence of the committee on program as well as upon the Dental Congress about to meet in August at Chicago in connection with the World's Fair that not a committee, not even a paper has been provided on the Art and Science of Anæsthesia. A science that should stand pre-eminently above all other sciences connected with or pertaining to the Art and Science of Dentistry. As much more important than all others, as life itself is more important than the mere conveniences of life. Is there any other subject that (if life and health are important to the Dental profession) deserves more attention and concentration of talent and time to discuss and develop, than this much neglected Art and Science? Is it not also a sad comment upon the World's Fair, as well as upon the nation, that among the hundreds of Congresses provided on the various subjects not a Congress, not even a Committee, nor a scientific paper has been provided upon this neglected subject. Nay, more and worse than all this, the World's Fair itself has taken special pains to prevent any demonstration of Appliances or Agencies for the purpose of producing Anæsthesia safely and in a superior manner.

Who is at fault for this gross neglect and wilful prevention of exhibition of Appliances, Anæsthetics and demonstrations? At the instance of whom has this important Art and Science been smothered out of existence in the World' Fair? These are grave questions which if truthfully answered will expose to an intelligent world a degradation of character and a despicable chicanery that should bring everlasting disgrace upon all concerned. The goddess of money, at whose shrine the World's Fair has ever bowed the suppliant knee, and for which the authorities have yielded space, principles and honor, and set aside Art—Science, literature, stultified progress and prevented scientific developments. These are not mere flippant statements arising from a hypercritical source, but stern unvarnished facts be it humbly spoken to the dishonor and humiliation of this great nation, and yet in perfect keeping with the various methods resorted to for the purpose of rescuing for the sake of the "mighty dollar" the management of the World's Fair from the nation itself, kidnaping the child to be ruthlessly slain in dishonor upon the altar of this coveted goddess.

PROF. CHARLES GILBERT DAVIS, M. D., M. S. A., Dean of the School of Anæsthesia, of Chicago, has been recently added to the editorial staff of THE D. & S. MICROCOSM. That the readers of this journal may have the pleasure of at least a partial personal acquaintance with the Doctor, with his introductory lecture in the school,we present a half-tone photo as a frontice piece to this issue. Prof. Davis is Surgeon in Chief of the Baptist Hospital in Chicago and but recently resigned the same position in the Temperance Hospital of the city to accept his present position. He is a most excellent surgeon, a ready and willing worker, and consequently as a result is entirely over worked. He has one of the largest and most lucrative practices in his profession in the city; his practice extending all over the U. S. A., he has but little time to devote to his favorite themes in the sciences, yet we trust that the readers of the D. & S. MICROCOSM may be frequently favored with articles from his vigorous pen.

SINCE the formation of the Dental Department of the University of Pennsylvania the total number of graduates has been 699. Last term 89 completed their course and received the degree of D. D. S.

## COLUMBIA DENTAL CLUB, CHICAGO.

The Dentists of Chicago have organized the Columbia Dental Club, for the entertainment of Dentists visiting Chicago during the continuance of the Exposition. They have rented the entire house at 300 Michigan avenue (about four squares from the Art Palace on the lake front), and it will be kept open daily for the convenience of Dentists.

The club will be used as headquarters for the *World's Columbian Dental Congress*, during the month of August and perhaps after July 15, 1893. Dentists who contemplate a visit to Chicago may have their letters addressed in care of the club. Members of the profession in Michigan, Illinois, Wisconsin, Iowa, Missouri and Kentucky, are invited to send pictures, bric-a-brac and curios to embellish the rooms; everything of value will be returned to the owners after the Exposition closes. The profession in Illinois will furnish the club house, and those who contribute fifteen dollars ($15.00) will be entitled to a full paid, non-assessable membership for the six months. On behalf of the organizers.

A. W. HARLAN, *Secretary General*,
World's Columbian Dental Congress.

## IN MEMORIAM.

William Warren Hayes, D. D. S., only son of Dr. and Mrs. Samuel J. Hayes, of 804 Penn avenue, Pittsburg, died of consumption and chronic diarrhœa on July 10th, 1893, at 4:15 A. M., at the residence of his parents, aged 24 years, 2 months and one day.

It is not often that a young man with such favorable surroundings and no hereditary predisposition to consumption and yet so full of life, ambition and vim, is taken so speedily and ruthlessly from the work of his chosen profession, as was this gifted and brilliant young man.

He graduated in the year 1891 with honors at the University of Maryland Dental Department and immediately returned to practice his profession in the office of his father with whom he had previously spent five years as a student and was soon placed in charge of the office and although but then in his 21st year, he soon made a host of friends and with his marked ability and skill was rapidly going to the front ranks of the Dental profession. He had superior mechanical skill developed by his inherent genius, which knew no such thing as fail and which brought him to distinction, especially in Prosthetic Dentistry. Though as a fine operator, he had but few equals.

It is believed, he died a Christian. His last words audibly spoken were "God knows," when presently the expression of suffering and anguish that had been depicted upon his countenance for weeks was displaced with a peaceful, serene expression of joy, mingled with a bright halo of glory, when the spirit left the body to dwell beyond this vale of sorrow. Besides his numerous friends, who so generously contributed in substantial tokens of love during his illness, he leaves a loving father, a fond and devoted mother, three kind, loving and devoted sisters, also, his endeared affianced (to whom he was to have been married in September next), to mourn their sad loss, but not without a bright hope of meeting in the better world.

"A precious one from us has gone,
A place is vacant in our home,
Which never can be filled.
God in his wisdom has recalled,
The boon His love has given
And although the body slumbers here,
The soul is safe in heaven."

A prominent figure has passed from the activities of the dental profession by the death of Dr. Fred A. Levy. Whoever has attended a New Jersey Dental Convention for the last twenty-five years could not fail to see the smiling face and persistent activity of the Doctor. He was quite as active and useful in the Central Dental Association as in the National Association of Dental Examiners, where he was Secretary for many years.

### DR. WILLIAM F. REHFUSS.

We are surprised to be called on to announce the death of this promising young man. He was only twenty-six years of age, and yet he had already come so prominently before the dental profession that his name and writings are familiar to us all. His magazine articles were vigorous and learned. But he was chiefly known as a writer on dental jurisprudence. His book on this subject is a standard work. What has associated him more with the readers of the *Items of Interest* is his series of articles on "Oral Diseases, Surgical and Nonsurgical," now passing through the present volume. He had just finished his portion of this series, the last of which will appear in the June number. Then the portion belonging to his associate, Dr. Brinkmann, will be taken up.

Dr. Rehfuss had hardly an hour's notice of the approach of death. It was only "a cold." And who cannot successfully manage "a cold?" But its course was rapid, developing congestion of the lungs and kidneys, and finally involving the whole system, less than a week, and he was ready for the grave. Such is life ; to some so brief, and to all not long. Yet to each of us it is the most important, the most momentous, part of all eternity. —*Items of Interest.*

The *Southern Dental Journal* and *The Dental Luminary*, the former hitherto published at Atlanta, Ga., and the latter at Macon, Ga., have consolidated, and will hereafter be known under the head of the *Southern Dental Journal and Luminary*, to be edited by Dr. H. H. Johnson, and published by W. R. Holmes and Mason at Macon, Ga. We wish the united journal success and prosperity.

## "DEATH FROM MISADVENTURE."

The newspaper accounts of an inquest recently held, do not give a very clear idea of the sad circumstances under which a London dentist lost his life. From a personal inquiry into the matter there seems little reason to doubt that the cause of death was ordinary asphyxia, rather than respiratory paralysis from nitrous oxide. There were three 100-gallon cylinders in the room. Two were in a vertical stand in a corner. One of these were full, and turned off. The other was turned on, with the key in position, and was empty. The third was a new arrival, lying on the floor close by, wrapped in brown paper. From a comparison of cases recorded in business books, it is possible that the cylinder in use might have been half full, but a suggestion is possible that it was nearly empty, and that the new cylinder was to take its place in the stand. The deceased was found by a servant in a bent position in the corner of the room. The face-piece was near the mouth, whether held by the hand, or supported on the knees, is not certain. The left hand seems to have rested on the gas stand, and in this way a bruise on the anterior surface of the wrist may be accounted for. The body was warm, there was marked cyanosis, but no pulse, and artificial respiration was of no avail. A post-mortem examination showed slight hypertrophy of the left venticle, an engorged right heart, and the venous system everywhere much congested. The lungs were also extremely congested, but there was no foreign body in the air passages. It is difficult to imagine that anyone could sit upright in a chair and inhale gas from a face-piece held in the hand till the respiratory centre was paralyzed. The fnference is that the deceased intended changing the bottles in the stand, and took the idea of inhaling the small quantity which he supposed was left in the old bottle. It was enough to cause loss of consciousness; and slipping from the chair resulted in a position which prevented respiration. We found, as details, that the two-way stop-cock was hard to turn, and that there was a leak in the two-gallon bag used. We think the jury fully justified in returning a virdict of "Death from misadventure.

If the jury had returned a verdict of death from asphyxia they would doubtless have given the facts.—Ed.

## VICISSITUDES OF INVENTORS.

The history of invention is a medley of successes and failures.. Much as the world owes of its progress and prosperity to the inventors, its debts have seldom been paid. No biographies of man can show so sad a series of misfortune, struggle, ostracism, and poverty of appreciation as those of inventive genius. Sacrifice, patience, will power of the indomitable type, and an unquenchable faith in results have been peculiarly characteristic of inventors as a class. It is seemingly a law in the process of mechanical evolution that, as in that of the organic world, the end to be reached is over a rocky roadbed of sacrifices and penalties. The process of invention is familiarized with this inscrutable but inevitable law, and though but a fractional part of the story has ever been told, there is enough of ashes left to tell the fact of the fire.

The inventor of printing by movable types was exiled from Strasburg to return a penniless wanderer, while those who stole his art not only robbed him of fame, but amassed wealth by their larceny.

Crompton, the inventor of the "mule jenny," was compelled by the weavers of Blackburn to take it to pieces and hide it as he would a purse from a thief. He held on faithfully to his idea, and when the storm subdued, reconstructed his machine, and as its merits became established the room in which it stood became a Mecca, with the capricious populace climbing into his windows by means of impromptu ladders. The inventor was persuaded not to secure a patent, but to donate his invention to the public. He did so, the public getting rich and the generous old man ending his days in privation and poverty.

Cartwright, the inventor of the power loom, after spending a fortune of $150,000 to enrich his countrymen by his machine, was dogged by calumny and outrage, his patent rights infringed, and his mill burned to the ground. His services to public interests were eventually recognized, but not till the price had thus been paid.

Kay, the inventor of the fly shuttle, was beset with law suits, his rights infringed, and, after devising a power loom, a mob of weavers broke up his machine; the unfortunate inventor having to fly to France to save his life, the end of which was death in exile and poverty.

Examples could be multiplied without number in which the same story has been retold. Men are living to-day whose inventions have been stolen by others, or otherwise manipulated so as to deprive them of their legitimate rights. The stealing of mechanical secrets is by no means rare, even consuls in foreign countries doing the larceny under the guise of patriotism. In some of our modern legal disputes as to the priority of some inventions, it occasionally crops out that the original idea was a stolen article, and the theft consummated by a barefaced claim to its inception and a consequent legal right to its returns. In these days more than in previous eras of history, inventions that are of public service can, in veteran hands, be made sources of considerable wealth, and when we consider that human nature is no more exempt from trickery in the nineteenth century than in any of its predecessors, it makes no difference in men whether they steal a patent or deceive an inventor. One thing is sure, aside from all moralizing, the history of invention in the past, and its unwritten story of the future, will be of one piece in its record of failures, struggles, successes, and the old hash in which the cook has less of the soup than the gourmand.—*The Age of Steel.*

## DR. SUDDUTH VINDICATED.

Dr. Sudduth handed in his resignation as an honorary member of the Society, as he considered it his duty to tender his resignation pending the result of his trial by the Minneapolis Dental Society. The resignation was received, but not accepted. A committee of five was appointed to investigate and report. The committee, after due deliberation, brought in the following report :

*To the President and Members of the Southern Minnesota Dental Society:*

We, the committee appointed to consider the resignation of Dr. W. X. Sudduth, honorary member of this Society, now under charges preferred by the Minneapolis Dental Society of having violated the code of ethics, do respectfully submit the following report :

That we have investigated the charges, have read the article which appeared in the *Minneapolis Tribune* of March 6th, 1893, on which the said charges are based ; that we have considered the report of the trial of Dr. Sudduth, before the said Society up to date. In our opinion the original article contains nothing on which to sustain the charges, and we do not consider it a violation of the code of ethics. After carefully considering the stenographer's report of the trial, and of such knowledge as we have of the case, it appears to your committee that animus has been shown in the bringing of the charges and the conducting of the trial. We feel that an injustice has been done to an honorary member of our Society.

We would therefore recommend that the resignation of Dr. W. X. Sudduth be not accepted, and that we exonerate him from the charge of violating the code of ethics.

Recognizing, as we believe, in this action a covert attack on the College of Dentistry of the Department of Medicine of the University of Minnesota, we would recommend that the Society place itself on record as deprecating such action, and express its confidence in the institution under its present management.

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DENTAL JURISPRUDENCE.—The somewhat novel suit brought in the district court at St. Paul, by a dentist, D. D. Smith, against William Woolsey, to recover for a set of teeth, said to have been made by the plaintiff for the defendant, and for which the defendant has refused to pay, has been decided by Judge Kelly. The decision discharges the order to show cause why Woolsey should not give up the teeth to the sheriff to sell at a public auction to the highest bidder, and thus afford the plaintiff relief. The judge holds that the teeth, as long as they remain in the mouth of the defendant, are a part of his anatomy and cannot be seized, but should they ever, by chance, fall from the mouth of Woolsey into the hands of the vigilant deputy sheriff, the plaintiff can cause them to be seized and disposed of.

---

Miss Bessie Norton died in the dental office of Dr. C. R. Pullen, of Denver, Col., June 20, from the effects of ether administered at the advice of Dr. Roley, who was called in to make the customary examination.

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Subscribe for the D. & S. MICROCOSM.

## THE WORLD'S COLUMBIAN DENTAL CONGRESS.

### SPECIAL NOTICE.

*To the Officers of Dental Societies in the United States and Foreign Countries:*

GENTLEMEN:—The Committees on Membership and Registration of the World's Columbian Dental Congress will be saved much trouble and the applicants for membership much vexation if the members of dental societies in good standing are furnished with credentials or certificates of membership, so that they may be presented at the desk where intending members apply for their membership cards.

Advanced membership cards will be furnished on application to the Secretary of the Gen'l Executive Committee, or the Secretary General of the Congress when the membership fee ($10.00) accompanies the application.

A. O. HUNT, *Sec'y of the Gen'l Executive Com.,*
A. W. HARLAN, *Sec'y Gen'l of the Congress,* Iowa City, Iowa.
No. 1000 Masonic Temple, Chicago, Ill.

## WOMEN DENTISTS

### IN THE UNITED STATES AS FAR AS ASCERTAINED.

| | |
|---|---|
| California | 6 |
| Colorado | 4 |
| Connecticut | 2 |
| District of Columbia | 3 |
| Florida | 1 |
| Georgia | 1 |
| Illinois | 17 |
| Iowa | 4 |
| Indiana | 5 |
| Kansas | 13 |
| Kentucky | 1 |
| Minnesota | 3 |
| Massachusetts | 2 |
| Maryland | 1 |
| Montana | 3 |
| Michigan | 6 |
| Mississippi | 1 |
| Missouri | 3 |
| New York | 10 |
| New Jersey | 3 |
| Ohio | 6 |
| Pennsylvania | 30 |
| Rhode Island | 2 |
| South Dakota | 1 |
| Texas | 6 |
| Utah | 1 |
| Wisconsin | 5 |
| Whole No. | 140 |

## HOLLÆNDER (L.) ON THE USE OF PENTAL AS AN ANÆSTHETIC.

Since I have been using pental one year, and made about nine hundred narcoses, I can sum up and communicate my experience in the following brief sentences:—

Of course, my assertions refer only to minor operations, as I have never performed major surgical operations with the material.

1. Pental is an effectual anæsthetic in all cases, and for that reason differs greatly from ethyl bromid, which in some cases is ineffectual.

2. Anæsthesia is induced more slowly than with ethyl bromid, but lasts longer, and the patients only regain consciousness gradually.

3. The least excitement is extraordinarily rare. As yet I have, regarding the following results, not observed any irritation of the stomach nausea and vomiting, much less trembling, trismus, aphasia, etc.

4. Neither the heart's action nor inhalation is quickened during the administration; however, the pulse at times, especially in anemic individuals, is somewhat weaker, whereas in very excited people it is slightly accelerated.

5. Generally two or three c. cm. are sufficient for anæsthesia in composed people. Ten c. cm. are adequate in most cases for the extraction of five to ten teeth.

6. Very excitable and strongly anemic patients, with a weak heart-action and an old bronchial catarrh, do not endure pental as well as healthy ones.

7. The best manner of administration is that with the Junker apparatus, the advantages being that the admission of the vapors into the lungs can be regulated, and that they are prevented from entering the eyes; also that less is used, and the disagreeable odor for some people is not so noticeable. Professor V. Mering is at present trying through experiments to weaken the too quick effect of pental, and also to mask the disagreeable odor by the admixture of another preparation.

8. Anæsthesia takes place in from one to three minutes.

Notwithstanding all these advantages of pental, I do not wish to assert that it may or can be administered less observantly than any other narcotic. All clothing about the neck, chest and abdomen must be loosened, and the respiration continually watched by a physician or trained assistant. The dentist or surgeon cannot operate and at the same time, during the operation, observe dangerous symptoms.

Without doubt, at times unpleasant as well as dangerous symptoms may occur through the use of pental, as well as with all other narcotics; but whether occasioned by pental, peculiar dispositions of patients, or lack of precaution on the part of the physician, and how the same may be avoided, can only be decided by observation and experience of different workers.

Pental is at present, on account of its sure effect and the wonderfully comfortable feeling of patients after anæsthesia, the best narcotic for all operations of short duration.—*Extract Exchange.*

## NEW JERSEY STATE DENTAL SOCIETY.

The Twenty-fourth Annual Meeting of the New Jersey State Dental Society will be held at the West End Hotel, Asbury Park, July 19, 20 and 21.

CHARLES A. MEEKER, D. D. S.,
*Secretary.*

## NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The annual meeting of the National Association of Dental Faculties will be held in the house of the Columbian Dental Club, No. 300 Michigan avenue, Chicago, beginning on Thursday, August 10, at ten o'clock A. M., and continuing through that and the succeeding day. It is important that all matters of business to come before that meeting, be properly prepared beforehand, so that business can go promptly forward. It is to be hoped that all persons interested will give special attention to this request, and that every member be promptly present at the beginning of the meeting, as only the two days will be available for the work.

J. TAFT, FRANK ABBOTT, A. C. HUNT,
*Executive Committee.*

## WORTH READING.

[From the JOURNAL OF AMERICAN MEDICAL ASSOCIATION.]

"Just a word to those good doctors,
Who are meditating deep,
On a paper they're preparing,
Full of thoughts too good to keep—
Boil it down.

'Tis not words, but facts we're wanting;
Therefore prune and pare with pains
Your scholastic evolution
Till an essence pure remains—
Boil it down.

Welcome every fresh advancement,
Hail, each new discovered fact,
But in writing a description
That attention will attract—
Boil it down.

And remember that discussions
Are of interest all agree;
So your paper should invite it;
Make it short as well may be—
Boil it down.

## THE PAN-AMERICAN MEDICAL CONGRESS.

Meeting: Washington, September 5th, 6th, 7th and 8th, A. D. 1893. The membership of the Congress already embraces the representative men of the various American countries. A number of distinguished European guests are expected. Present indications point to a large attendance.

WILLIAM PEPPER, M. D., *Pres.*, Philadelphia, Pa.
A. M. OWEN, M. D., *Treas.*, Evansville, Ind.
CHARLES A. L. REED, M. D., *Sec. Gen'l.*, Cincinnati, Ohio.

## PERMANENT OFFICERS OF THE WORLD'S COLUMBIAN DENTAL CONGRESS.

PRESIDENT.—L. D. Shepard, Boston, Mass.

VICE PRESIDENTS.—W. W. H. Thackston, Farmville, Va.; A. L. Northrop, New York City; W. H. Morgan, Nashville, Tenn.; W. W. Allport, Chicago, Ill.; W. O. Culp, Davenport, Ia.; C. S. Stockton, Newark, N. J.; Edwin T. Darby, Philadelphia, Pa.; H. J. McKellops, St. Louis, Mo.; J. Taft, Cincinnati, O.; J. H. Hatch, San Francisco, Cal.; J. B. Patrick, Charleston, S. C.; J. C. Storey, Dallas, Tex.

SECRETARY GENERAL.—A. W. Harlan, Ghicago, Ill.

ASSISTANT SECRETARIES.—Geo. J. Freidricks, New Orleans, La.; Louis Ottofy, Chicago, Ill.

TREASURER. John S. Marshall, Chicago, Ill.

EXECUTIVE COMMITTEE.—W. W. Walker, Chairman, 67 West Ninth street, New York City; A. O. Hunt. Secretary, Iowa City, Ia.; L. D. Carpenter, Atlanta, Ga.; J. Y. Crawford, Nashville, Tenn.; W. J. Barton, Paris, Tex.; J. Taft, Cincinnati, O.; C. S. Stockton, Newark, N. J.; L. D. Shephard, Boston, Mass.; A. O. Hunt, Iowa City, Ia.; H. B. Noble, Washington, D. C.; Geo. W. McElhaney, Columbus, Ga.; J. C. Storey, Dallas, Tex.; M. W. Foster, Baltimore, Md.; A. W. Harlan, Chicago, Ill.; J. S. Marshall, Chicago, Ill.; H. J. McKellops, St. Louis, Mo.

The meeting will be held in Chicago, August 17-29, 1893.

## TO LICENSEES.

Hayes Dental and Surgical Manufacturing Company would again call the *special attention* of Licensees of Hayes Process of Anæsthesia to the important fact that they have secured special lessons of the School of Anæsthesia for their Licensees. In accordance with a recent resolution of the Board of Directors of the College of Anæsthesia, in consequence of the great financial depression, the regular terms were reduced one-third for this summer only. The regular terms formerly secured for Licensees were $60 for the course and diploma, if found duly qualified. Therefore, by the recent act of the Board, it is now only $40. This advantage has been secured by pressing the thought that if thus reduced very many of the Licensees would take advantage of this reduction this summer.

We trust that Licensees will avail themselves of the advantage secured, for their benefit by this great reduction.

## A NEW BOOK ON THE ART AND SCIENCE OF ANÆSTHESIA, OR HYPNOTISM,

By the Editor of The Dental and Surgical Microcosm, will shortly make its appearance. It is designed as a text book for the earnest student of science and art, who is not satisfied with simply knowing results, but aspires to know the cause of every result, knowing full well that there is never a result without a cause ; never paralysis of nerve center, never asphyxia and never a death without a cause. That knowing the causes of the unpleasant results so frequently obtained, he may be able to remove the cause and obviate these undesirable and lethal effects. In this book there is an entire departure from the usual prosaic narrative, historical manner of presenting the subject, and instead, the actual practical work of the art and science is presented in such vivid, startling and inspiring thoughts as to enable the student at once to grasp the great fundamental truths and principles which are the bed rocks upon which this profound art and science rests.

Many orders for the book have already been received, and will be filled in the order in which they have been received. Others contemplating ordering the book will do well to send their orders at once to Hayes Dental and Surgical Manufacturing Company, stating the character of the binding they wish.

Price of Book in Good Leather Binding is....$3 00
" " Cloth " .... 2 00
" " Paper " .... 1 00

When the book is ready to be delivered, those whose orders have been received will be notified in the order of receiving, and on the reception of the money for the price of the book ordered, the book will be promptly delivered per express, mail, or as otherwise ordered.

## PENNSYLVANIA STATE DENTAL SOCIETY.

The Twenty-fifth Annual Meeting of the Pennsylvania State Dental Society will be held at the Mountain House, Cresson, Pa., on Tuesday, July 11, 1893. Convenes at 10 A. M. One-day session.

C. V. Kratzer,
*Secretary.*

## THE HAYES PROCESS OF ANÆSTHESIA,

For the relief of pain in all dental operations (usually painful), stands peer to everything else. In fact, there is nothing so well adapted to give relief to nervous patients, who are exceedingly sensitive, as the Aerated Hypnotic by the Hayes Process.

It is not necessary to produce profound anæsthesia, or to carry the patient into a state of unconsciousness in order to get absence of sensation. Just a few inhalations, even with the rubber dam on the teeth, and you can proceed to operate without pain.

We receive many letters urging us to make known more fully the merits of this Process, etc., of which the following, from Dr. Pittwood, is a sample. As we have never had the pleasure of the Doctor's acquaintance, nor yet none of our agents ever saw him, and as this comes to us entirely unsolicited and not as an advertisement or testimonial, but simply to let us know how he is succeeding, it will be of service to the profession who desire information concerning the same, and by permission obtained from the Doctor since receiving it, we publish it herewith:

SPOKANE, WASH., February 19, 1893.

*Dr. S. J. Hayes, Chicago, Ill.*:

DEAR DOCTOR—I have worked day and night since receiving my Apparatus, and this is the first opportunity I have had to write to you. I am using the Hypnotic on every patient for filling teeth, and they are all delighted and say that they will not have their teeth filled by any other method so long as I am near.

I have all the people talking about it, and already feel that I will reap a bountiful harvest that I could not receive only through the use of this wonderful Process you have discovered. My patients are very enthusiastic and speak of it in the highest terms. I, myself, am delighted over it. I would advise you to add in your pamphlets an article on filling teeth without pain. A great many dentists will think by reading the Pamphlet that it is good only to extract, and will not go to the expense of purchasing a Right. Had you not assured me, also others to whom I wrote, that it was the very thing for Sensitive Dentine, I would not have gone to the expense to purchase an Exclusive Right. I have the Hale-Lennox methods and they are no comparison to the Hypnotic. The hot gas produces pain to the teeth, gums and lips, the blast cannot be confined to the cavity, and in using it, I have concluded that there is a good deal of pain produced by the application to save possibly lesser pain, which is that of drilling in the cavity. The Hypnotic in its second stage acts almost wholly upon the sensitive nerves, the motors are not affected, the patients' remarks are, "Isn't it wonderful? I have my consciousness, can move, talk and act, yet, all this drilling does not hurt me." They are simply astonished at the results.

To give my patients confidence, I allow them to hold the Generator telling them that when they feel that they are near the jumping off place to hand it to my assistant. They then take it willingly and have no fear. I will soon have this town worked up over this method. Had nearly a column in the paper, and if I can find it I will clip it out and send it to you. My friends tell me that everybody is talking about it, and that those who have taken it are very pronounced in their praise. Doctor, you have a wonderful discovery and for the benefit of humanity push it, and let the world know it.

I think I will need another Generator soon, am of the opinion that one will not be sufficient to handle my practice.

Hope some day to have an article for the D. and S. M.

Yours respectfully,

EDWARD PITTWOOD, D.D.S.

*Respectfully submitted*,

HAYES DENTAL & SURGICAL MFG. CO.

## HAYES DENTAL AND SURGICAL MANUFACTURING CO.

The attention of dentists and physicians is respectfully invited to the new headquarters of the Hayes Dental and Surgical Manufacturing Company, in the Schiller Theater Building, Randolph street, near Dearborn, Chicago, where "Hayes Process of and Apparatus for Generating and Applying Anæsthetics" will be found in use and its superior merits demonstrated by Dr. Hayes himself and others, in connection with various surgical operations.

In view of the restrictions attempted by the authorities at the World's Fair, in not allowing demonstrations, we deemed it wise and to our best interests to resign the space assigned and to secure ample space in the elegant Schiller Building to exhibit and fully demonstrate the superior results of this marvelous Process of anæsthesia with "Pure narcotized air;" and now we cordially invite all physicians and dentists to visit our spacious rooms and see the demonstrations.

Here copies of THE DENTAL AND SURGICAL MICROCOSM can also be secured.

## TO LICENSEES OF HAYES PROCESS OF ANÆSTHESIA.

We desire to call the attention of the Licensees of "Hayes Process of Anæsthesia, or Hypnotism" to the fact that any failure to get the desired anæsthesia within less than two minutes and in some patients within half a minute is due not to the Hayes process, nor to the Hypnotic, but to the failure in conducting the anæsthesia, and we would advise such by all means to take the course at the Post Graduate School of Anæsthesia, and become an expert in the art and science. Once an expert and it will be worth more to you in your professional duties than $1,000, in that it will earn you more than that amount of money. Read up, read the DENTAL AND SURGICAL MICROCOSM, and come prepared to graduate with honor to yourself and class. Remember the School is in session during the World's Fair, and that at least one month's attendance is expected in thorough training.

Nothing can be of greater interest and importance to the licensees of Hayes' Process of Anæsthesia than to take a course at the Post-Graduate School of Anæsthesia, in Schiller Theater Building.

Here they will find abundant demonstrations of its superior qualities and results in various surgical operations; such as in excavating sensitive dentine, extraction of teeth, removing pulp and nerves, opening abscesses, etc., and also in gynæcology and all sorts of general surgical operations, in connection with hospital work.

Besides, he who will have taken this course is armed for success and protection in the active duties of his honorable calling. Let none miss this opportunity of taking this course while attending the World's Fair. Aim to be one of the first in the civilized world to take this special course of study and receive the degree of M. A. S. A., (Master of the Art and Science of Anæsthesia.)

The death that recently occurred from the use of nitrous oxide gas, in Buffalo, N. Y., it seems is furnishing a subject for legislation in that State. Our contemporary, *The Dental Advertiser*, is agitating the subject for the protection of the dental profession, or for equal rights before the law with medical practitioners. In a future number we will take occasion to advocate equal rights, but to show that special training in the art and science should be required and that a diploma from either a Dental or Medical School does not give evidence of this training in the present status of the schools.

## SPACE RE-SIGNED.

The Hayes Dental and Surgical Manufacturing Company have re-signed the space assigned them for exhibit at the World's Columbian Exposition, for the reason mainly, that those in authority have placed unwarrantable and unwise restrictions upon some of their exhibits. The most important exhibit designed, was that of "Hayes Process of, and Apparatus for Generating and Applying Anæsthetics." In this they would not allow demonstrations in the use of the same.

What advantage can there be in exhibiting a mechanism without showing its utility and advantages, its superiority over any and everything else designed for the same purpose.

What benefit will a manufacturer of a corn sheller, a reaper, or a sewing machine, derive from an exhibit if he be not allowed to demonstrate its usefulness and superior qualities. But manufacturers of other mechanisms are allowed by the same authorities to demonstrate the utility and superior qualities of their merchandise. Is there anything of more importance to humanity than life and the means and instrumentalities of saving life? Is there anything of greater importance to the medical and dental professions than the art and science of anæsthesia, or hypnotism and the appliances in reference thereto? Yet, that which is of more importance than anything else connected with the World's Fair, cannot be allowed a demonstration in connection with the exhibit of the appliances in the Manufactures and Arts Building. This very unreasonable attitude assumed evidently has been brought about by influences and considerations most unjustifiable and degrading to the honor of a great nation's World's Fair.

## OUR DENTAL COLLEGES FOR 1893.

| | Matriculate. | Graduate |
|---|---|---|
| Dental Department University of Maryland, | 108 | 16 |
| Ohio College of Dental Surgery, - - | 121 | 15 |
| Alabama Dental College, - - - - | 15 | |
| H. W. Dental College, Cleveland, - - | | 2 |
| Western Dental College, Kansas, - - | 93 | 6 |

No 4 of present volume was not published,
in order to start Vol 4 with the calendar year

## WANTS, FOR SALE, ETC.

Our terms for advertising under this head are 5 cents per word. Initials will be charged same as words. Advertisements must be in our hands fifteen days before the first day of the month of publication, to insure insertion in following number. Cash or postage stamps must accompany all advertisements.

HAYES DENTAL & SURGICAL M'F'G CO.,
804 Penn Ave., Pittsburg, Pa.

WANTED—Experienced all-around Dentist, thoroughly competent. Address, Dr. BUNN, care Dental & Surgical Microcosm, 804 Penn Avenue, Pittsburg, Pa.

WANTED—Thoroughly competent Dentist, in porcelain art, bridge and crown work. Address, DR. WHITE, care Dental & Surgical Microcosm, 804 Penn Ave., Pittsburg, Pa.

WANTED—To buy (cheap) Archer Dental Chair, for extracting. Address, DR. J. PALMER, care Hayes Dental & Surgical M'f'g Co., Chicago, Ill.

WANTED—A Partner in dental business who is thoroughly competent in prosthetic dentistry, in crown, bridge and porcelain art work. Address, Dr. C., care THE DENTAL AND SURGICAL MICROCOSM, Schiller Theater Building, 13th Floor, Chicago, Ill.

WANTED—To buy complete Dental Outfit, second-hand. Must be in good condition. Address, DENTIST, care THE DENTAL AND SURGICAL MICROCOSM, Schiller Theater Building, 13th Floor, Chicago, Ill.

WANTED.—An expert extractor of teeth. None other need apply. Address, The Dental & Surgical Microcosm, 804 Penn Avenue, Pittsburg, Pa.

FOR SALE—In city of 300,000 population, a complete Dental Outfit, Latest Wilkerson Chairs, Fountain Spittoon, etc., and good practice. Cheap, part cash and on time. Address, Dentist, Hayes Dental and Surgical M'f'g Co., Schiller Theater Building, Chicago, Ill.

# DIRECTORY OF DENTAL SOCIETIES.

*American Dental Association*—Meets in August, 1893, in Chicago, Ill. Pres., J. D. Patterson, Kansas City, Mo.; Rec. Sec., Geo. H. Cushing, Chicago.

*Southern Dental Association*—Meets at Chicago, Ill., 1893, exact time to be decided later. Pres., B. Holly Smith, Baltimore, Md.; Sec., D. R. Stubblefield, Nashville, Tenn.

## STATE DENTAL SOCIETIES.

*Dental Society of the State of Maryland and District of Columbia.*—Meets annually. Next meeting at Washington City, on the second Tuesday in October, 1893. Pres B. F. Coy, of Baltimore; Sec., M. W. Foster, Baltimore.

*Minnesota State Society*—Pres., C. H. Goodrich, St. Paul; Sec., L. D. Leonard, Minneapolis. Meets in St. Paul, September 6, 1893.

*Missouri Dental Association*—Meets at Excelsior Springs, Mo., second Tuesday in July, 1893. Pres., J. D. Patterson, Kansas City, Mo.; Sec., Wm. Conrad, St. Louis.

*New Jersey State Dental Society.*—Meets annually. The meeting will be held in 1893, exact time and place to be decided later. Pres., Oscar Adelberg, Elizabeth; Sec., C. A. Meeker, Newark.

*New Hampshire Dental Society.*—Meets annually. Next meeting will be held in Concord, N. H., time to be decided later. Pres., W. R. Blackstone, Manchester; Sec., Burton C. Russell, Keene.

*North Carolina State Dental Society.*—Meets in Morehead City, August 11, 1893. Pres., H. C. Hearing, Concord; Sec., C. A. Rominger, Reidsville.

*North Dakota State Dental Society.*—The next meeting will be held in Grand Forks, in 1894, the exact time will be given later. Pres., B. D. McLean, of Jamestown; Sec., R. B. Foster, Grand Forks.

*Ohio State Dental Society.*—Meets annually. Next meeting at Columbus, first Tuesday of December, 1893. Pres., Geo. H. Wilson, Cleveland, Sec., L. P. Bethel, Kent.

*Pennsylvania State Dental Society.*—Will hold its next annual meeting in 1893. Time and place to be decided later. Pres., W. E. VanOrsdel, Sharon: Cor. Sec., C. V. Kratzer, Reading.

*Rhode Island Dental Association*—Pres., S. W. Clark, Providence; Sec., H. W. Gillett, Newport. Meets quarterly, second Tuesday in July, October, January and April. Annual meeting second Tuesday in July, at Providence.

*South Carolina State Dental Association*—Meets annually. Pres., C. S. Patrick, Charleston. Cor. Sec., H. J. Ray, Aiken. Next meeting at Columbia, S. C., in August, 1893.

*Tennessee Dental Association*—Meets annually. Next meeting at Chattanooga, first Tuesday in July, 1893. Pres., S. B. Cook, Chattanooga, Tenn.; Rec. Sec., P. D. Houston, of Lewisburg; Cor. Sec., R. R. Stubblefield, of Nashville.

*Vermont State Dental Society*—Meets annually. Next meeting at White River Junction, third Wednesday in March, 1894. Pres., A. J. Parker, Bellows Falls; Sec., Thomas Mound, Rutland.

*Wisconsin State Dental Society*—Meets annually. Next meeting will be held at Janesville, Wis., the second Tuesday in July, 1893. Pres., W. C. Wendel, Milwaukee; Sec., C. A. Southwell, Milwaukee.

*West Virginia State Society.*—The annual meeting will be held at Parkersburg, on the first Wednesday of October, 18 3. Pres., J. N. Mahan, Charleston; Sec., Geo. I. Keener, Morgantown,

## LOCAL SOCIETIES.

*American Academy of Dental Sciences*—Meets annually in Boston, Mass., on the first Wednesday in October, 1893. Pres., J. H. Batchelder; Rec. Sec., E. E. Hopkins; Cor Sec., E. B. Hitchcock, Boston.

*Brooklyn Dental Society and Second District Society United*—Meets quarterly—Pres., T. H. Holly; Rec. Sec., A. N. Russell, Brooklyn.

*Central Dental Association of Northern New Jersey*—Meets bi-monthly and annually. The next annual meeting will be held about the middle of February, 1894. Pres., Harvey Iredell, New Brunswick; Sec., Wm. L. Fish, Newark.

*Chicago Dental Society*—Meets monthly. Pres., D. M. Cattell; Sec., L. S. Davis; Cor. Sec., T. L. Gilmer.

*Chicago Dental Club* Meets on the fourth Monday of each month. Pres., A. B. Freeman; Sec., C. Stoddard Smith.

*Cleveland Dental Society*—Meets the first Monday of each month. Pres., S. B. Dewey; Sec., Martha J. Robinson.

*Connecticut Valley Dental Society*—Will hold a Union Meeting in connection with the Connecticut State Dental Society at Hartford, in May, 1893. Pres., F. W. Williams, Greenfield, Mass.; Sec., Geo. A. Maxfield, Holyoke, Mass.

*Detroit Dental Society*—Meets monthly. Pres., E, C. Moore; Sec., H. C. Raymond.

*Eighth District Dental Society, N. Y.*—Annual meeting third Tuesday in April, 1894, in Buffalo. Pres., W. C. Hayes, Buffalo; Sec., W. W. Coon, Alfred Center.

*East Tennessee Dental Association*—Meets annually. Next meeting will be held at Athens, Tenn., in August, 1893. Pres., U. D. Billmeyer, Chattanooga; Sec. and Treas., A. W. Palmer, Chattanooga.

*Fifth District Dental Society of N. Y.*—Meets semi-annually. Next meeting in Syracuse, October 24–26. Pres., R. F. Jones, Utica; Sec., T. B. Mason, Phoenix.

*First District Dental Society of the State of New York*—Meets annually. The next meeting will be held on the second Tuesday of October, 1893. Pres., Wm. Carr, New York City; Sec., Benj. C. Nash, New York City.

*First District Dental Society of Illinois*—Next meeting will be held in Peoria, second Tuesday in September, 1893. Pres., O. M. Daymunde, of Monmouth; Sec., W. O. Butler, La Harpe.

*Knoxville City Dental Society*—Meets monthly. Pres., J. T. Cazier; Sec., A. J. Cottrell.

*Mississippi Valley Dental Society*—Meets annually at Cincinnati. Next meeting March, 1894. Pres., O. N. Heise, Cincinnati; Sec., H. T. Smith, Cincinnati; Cor. Sec., W. C. Matlack, Cincinnati, O.

*New England Dental Society*—Meets annually. Next meeting first Thursday in Oct., 1893. in Boston, Mass. Pres., J. F. Adams, Worcester, N. H.; Sec., E. O. Kinsman, Cambridge, Mass.

*Northern Illinois Dental Society*—Meets annually. Next meeting at Aurora, about November 1, 1893. Pres., E. R. Warner, Chicago; Sec., J. W. Cormany, Mt, Carroll.

*Northern Ohio Dental Association*—Meets annually. Next meeting at Put-in-Bay, on the second Tuesday in May, 1894. Pres., S. B. Deway, Cleveland, O.; Rec. Sec., F. H. Knowlton, Akron; Cor. Sec., J. F. Dougherty, Canton.

*Northwestern Dental Association*—(embraces portions of Dakota, Minnesota and Manitoba) meets annually. Next meeting at Detroit, Dak., on the fourth Tuesday in July, 1893. Pres. J. W Cloes, Jamestown, Dak.; Sec., S. J. Hill, Fargo, Dak.

*Odontological Society of Pennsylvania*—Meets on the first Saturday evening of each month, at 8 o'clock p. m., at Thirteenth and Arch streets. Pres., James Truman; Rec. Sec., A. W. Deane.

*Odontological Society of New York City*—Meets the third Tuesday of each month. Pres., Wm. Jarvie; Rec. Sec., E. T. Payne.

*Odontological Society of Cincinnati*—Meets monthly. Pres., C. M. Wright; Sec., W. M. Williams.

*Odontological Society of Chicago*—Meets monthly. Pres., G. Newkirk; Sec., E. Noyes.

*Pennsylvania Association of Dental Surgeons*—Meets second Tuesday of each month. Pres., H. E. Roberts; Cor. Sec, Theo. F. Chupein.

*Pittsburg Dental Society*—Meets the last Tuesday evening of each month. Pres., J. B, Williams, Homestead; Sec., N. L. Reinecke.

*San Francisco Dental Society*—Meets the second Monday evening of each month Pres., W. A. Knowles; Sec., Chas. Morffew; Treas., J. J. Birge.

*Sixth District Dental Society of N. Y.*—Meets semi-annually. The annual meeting will be held the first week in May, 1894, Pres., Chas. W. McCall, Binghampton; Sec., T. B. Fuller, Binghampton.

*Seventh District Dental Society of Ohio*—Meets annually. Next meeting in May, 1894. Pres., O. N. Heise, Cincinnati; Sec., J. R. Callahan, Cincinnati.

*Southern Illinois Dental Society*—Meets annually. Eighth annual meeting will be held at Edwardsville, Ill., on the third Tuesday in October, 1893. Pres., I. G. Dickson, McLeansboro; Sec, L. B. Torrence, Chester.

*Southern Minnesota Dental Society*—Next meeting in Mankato, second Tuesday in April, 1894. Pres., M. B. Wood, Mankato; Sec., F. B. Kremer, Minneapolis.

*St. Louis Dental Society*—Meets first and third Tuesday in each month. Pres., Dr. DeCourcy Lindsley; Cor. Sec., Wm. Conrad; Rec. Sec., J. G. Pfaff.

*The Isaac Knapp Dental Coterie of Ft. Wayne, Ind.*—Meets first and third Tuesday in each month. Pres, H. C. Sites; Sec., J. S. McCurdy.

*The Minneapolis Dental Society Monthly*—Pres., E. F. Clark; Sec., E. J. Morrison.

*The Tacoma Dental Society*—Meets monthly. Pres., M. C. Burns; Sec., W. E. Burkhart.

*Washington City Dental Society*—Pres., J. H. P. Benson; Sec., J. Roland Walton.

# THE SCHOOL OF ANÆSTHESIA,

## AND ANNEX.

### Post Graduate School of Prosthetic Dentistry, Oral Surgery and Hospital Facilities.

Will open May 1st, Monday, 1893, in the Schiller Theatre Building, 203-209 Randolph street, Chicago, Ill., and continue in session during the entire time of the Columbian World's Fair, with a full corps of thoroughly competent instructors in their respective specialties, most of whom have more than a national reputation.

FUTURE terms and their length will be arranged at the close of the first term.

This School is designed to supply a pressing want to both the Medical and Dental professions, and will aim to be worthy the confidence and hearty support of all.

It will be open alike to all schools of the healing art, whether of the Medical or Dental profession, and all shall share alike its advantages.

Thorough qualifications alone, shall be the consideration for a diploma.

And for knowledge and skill obtained anywhere in the Art and Science, due credit shall be given the applicant. Yet no less than one month's attendance in training and examinations will be accepted as sufficient from any candidate, for the honors of the School. Many may desire and need a much longer time. But the Faculty deem it necessary that at least one month be spent under their immediate instruction and training in the School of Anæsthesia, that there be no mistake made in awarding and conferring the degree of M. S. A. (Master of the Art and Science of Anæsthesia) upon those who are sent out by this School to assume the responsibility of producing Anæsthesia or Hypnotism.

The School has secured some of the most elegant rooms and lecture hall in the City of Chicago, with all the modern conveniences and appliances, and a College Faculty worthy the importance of the School.

The charges for the entire course of instruction, including Matriculation Fee and conferring of the Degree of M. S. A. and Diploma (if found to be duly qualified) is $100.

Half to be paid on entering the School, balance at time of examination.

In consideration of the present financial pressure, the Board of Directors have recently granted a rebate of one-third regular price during the summer, making present cost $66⅔ for entire course.

**THE ANNEX.** Thorough instruction will be given in Bridge- and Crown-Work' Porcelain Art and Inlays, etc., in the Annex Post-Graduate School of Prosthetic Dentistry.

Those desiring to take this course, can do so at the same time with the course of Anæsthesia, but will be required to furnish the necessary instruments for this work, and will be charged for the course, $35, or they can take the course independent of the course in Anæsthesia. After taking this course, they will receive a certificate of qualifications from the School.

If any desire further information, or arrangements made for rooms and boarding, write

**DR. SAMUEL J. HAYES,** *Secretary,*
*13th Floor, Schiller Theatre Building, Chicago, Ill.*

—OR—

***Prof. CHAS. GILBERT DAVIS, M. D., M. S. A., Dean,*** *ame address.*

# The
# Dental and Surgical Microcosm.

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## A QUARTERLY MAGAZINE

DEVOTED CHIEFLY TO THE

## Art and Science of Anæsthesia.

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EDITED BY

SAMUEL J. HAYES, D. D. S.; M. S. A.

ASSOCIATE, M. FRANCES R. HAYES, A. M.

CORRESPONDING EDITORS,

CHARLES GILBERT DAVIS, M. D.; M. S. A.
CHICAGO, ILL.

J. M. CLYDE, D. D. S.; M. S. A.
SPRINGFIELD, MO.

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VOLUME IV.

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814 N. NEGLEY AVE., PITTSBURGH, PENNSYLVANIA.
1895.

# THE

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**will be issued and mailed about the**

**FIRST OF JANUARY, APRIL, JULY AND OCTOBER.**

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THE
DENTAL AND SURGICAL
MICROCOSM.

VOL. IV. JANUARY, 1895. No. 1

# ANÆSTHETICS AND TRUE ANÆSTHESIA.

BY S. J. HAYES, D. D. S.; M. S. A.

In all ages of the world, man has eagerly sought means of relief from pain. It is said that the ancient Assyrians discovered the possibility of producing temporary unconsciousness by pressure upon the Carotid Arteries and Pneumogastric Nerves, and practiced the same for the relief of pain in circumcision. Alcohol and Carbonic Acid was applied to the wounds of the soldiers in the Siege of Troy by the Grecian surgeons to assuage their pain. In those remote ages the Chinese had also learned the Anæsthetic properties of Indian Hemp and Cannabis Indicus Hyoscyamus and used this drug for the purpose of benumbing the sensibility of those who were subjected to the operation of acupuncture.

But of all Anæsthetic drugs at the commencement of the Christian Era, Mandragora seems to have been the most extensively and successfully used; for this purpose it was infused in wine and the liquor thus prepared was known to the Greeks by the name of Morion. Thus Apuleius and Dioscorides taught that half an ounce of this Morion would render a person unconscious to the amputation of a limb, and that its effects would last for hours. But the Mandragora occasionally induced convulsions with other alarming symptoms, and consequently gradually became obsolete and was finally banished from the pharmacopœia.

The earliest record of Anæsthesia by inhalation is made by Herodotus, who says the Scythians were accustomed to produce intoxication by inhaling the vapors of hemp. This system was also used by the celebrated surgeon, Theoderic, of Bologna. The Italian surgeon, who learned this art from Hugo de Lucca as it had been transmitted from generation to generation, taught the preparation of a soporific inhalent, which constituted a decoction of opium, deadly night-shade, hyoscyamus, mandragora, hemlock, ivy, and lettuce. Sponges medicated with this decoction were dried in the sun and then stored away for use. When about to be administered, the sponge was moistened in warm water and the patient inhaled the vapor arising therefrom. After the operation the patient was aroused from this somnolent condition into which he had thus been placed, by the inhalation of vinegar from a fresh sponge. If this failed to awaken, the juices of wine were to be poured into the ears of the sleeping victim. But as the heroic use of these powerful narcotics, was attended with many alarming tendencies and unsatisfactory results, and as the arts of the sorceress fell into disrepute after the days of the Reformation of the church, it gradually went into disuse.

John Baptisto Porta of Naples, who wrote a work on natural magic in A. D. 1597, speaks of a "quintessence extracted from medicines by somniferous menstrua", the nature or process of which, he fails to explain. And yet these substances were to be kept closely sealed to prevent the escape of their volatile parts, without which the remedy lost its virtue. This evanescent substance, it is said, closely resembled sulphuric ether, and Dr. Snow asserts that it was ether and that it had been described more than fifty years before. But be that as it may, the effects upon the patient were very similar to those produced by sulphuric ether. Dr. Moore, of London, an eminent surgeon in 1784, in his extensive practice, used compression on the nerves of the limb or member requiring the operation. But this of itself was productive of much pain, and therefore was abandoned. The celebrated chemist, Sir Humphrey Davy, on April 9th, 1799, discovered that nitrous oxide gas, inhaled in lieu of the pure atmospheric air, would produce unconsciousness in the subject, and suggested the probable use of it for surgical operations. In 1828, Dr. Hickman suggested the use of carbonic acid as an Anæsthetic. As early as 1785 Dr. Pearson, of Birmingham, used sulphuric ether for the relief of spasmodic affections of respiration, but that it could produce insensibility was demonstrated by the American physicians Goodwin, in 1822, Mitchell, in 1832, Jackson, in 1833, Wood and Bache, in 1834. And yet it was first introduced to prevent pain in surgery by Dr. Morton, a dentist of Boston, in 1846, though Dr. Long, a physician of Jefferson, Georgia, by way of experimenting, administered it to a patient from whom he cut a tumor in March, 1842. Dr. T. C. Jackson claimed the discovery and its suggestion to Dr. Morton, and the French academy awarded the Monthyon prize of 2500 Francs to each; to the one, for discovery and to the other, for application. This discovery and success of anæsthesia in surgery was speedily published throughout the civilized world. This material had been in use only about one year when Dr. J. Y. Simpson discovered the anæsthetic effects of chloroform, and introduced its use into his extensive practice to relieve pain in child-birth. He read a paper before the Medico-Chronological Society of Edinburgh, on Nov. 10, 1847, in which he detailed the particulars of the successful administration of chloroform in more than fifty cases. Its agreeable qualities and its powerful concentration at once recommended it to general favor, especially throughout Europe. But in consequence of the numerous fatal results in its administration, it has, of late years, gradually fallen into disrepute, and is now comparatively very little used especially in the dental profession.

Although Sir Humphrey Davy first suggested in 1799 the probable use of nitrous oxide gas in surgical operations, yet it was first introduced in 1844, simultaneously, by two dentists, Drs. Wells and Riggs, who used it extensively in their practice and announced that "a new era in tooth-pulling had dawned." It was favorably received by the dental profession and extensively employed until its unpleasant results caused the more cautious and thoughtful to dispense with it and to warn the public against the dangerous and injurious effects of the asphyxia produced by this gas. Consequently, for a period of about fifteen years, it went almost out of use as a pain obtunding agent. At length, Dr. G. Q. Colton, who gave the nitrous oxide to Dr. Wells for the extraction of the first tooth ever removed by its use, while on one of his exhibition tours with this (as he then called it) "laughing gas," opened offices in New York City, and began to advertise extensively the painless extraction of teeth by this nitrous oxide. Others followed his example until, from numerous deaths and other unpleasant results, the more cautious have abandoned its use. Others, still, have clung to it notwithstanding the repeated warnings, some even announcing that they administer "vitalized air," for the purpose of allaying the fears of the public, and, from mercenary motives, they seek to beguile the thoughtless and unsuspecting into their offices. Vital air is oxygen gas, which, taken into the lungs, quickens the circulation of the blood and causes an exitement soon followed by inflammatory conditions and death. Vitalized air is pure atmospheric air plus any amount of oxygen gas, clearly having the same tendency to similar results as vital air.

Dr. Richardson has introduced bi-chloride of methylene, which combines the properties of chloroform and ether; but the use of this has been attended with very unsatisfactory results. The rapid evaporation of rhigolene by Richardson's spray, produces local anæsthesia in quite a satisfactory manner, and it deserves a more extensive employment than it has.

The author has more recently discovered a certain combination of chemical elements and a Process of developing a true anæsthetic by an apparatus of his own invention, which he modestly claims to be without a parallel in its safety, efficiency, and desirable results. The anæsthetic thus generated, he has appropriately named "Pure Narcotized Air." By this Process and Apparatus, the administration of sulphuric-ether, bi-chloride of methylene, or any other suitable narcotic, is rendered much more agreeable and safe, as well as being attended by more effective and satisfactory results.

# COMMENTS BY DR. S. J. HAYES.

### A MONUMENT TO BE ERECTED IN HONOR OF DR. HORACE WELLS.

### FOR WHAT? IT IS SAID FOR THE DISCOVERY OF ANÆSTHESIA.

"On a resolution offered by Dr. J. D. Thomas, the following committee was appointed to take into consideration and report suitable measures for the celebration of the fiftieth anniversary of the discovery of anæsthesia by nitrous oxide, by Horace Wells. The committee consisting of Drs. J. D. Thomas, Philadelphia; Thos. Fillebrown, Boston; J. Taft, Cincinnati; Jas. McManus, Hartford; H. W. Morgan, Nashville; W. C. Barrett, Buffalo; A. W. Harlan, Chicago; H. J. McKellops, St. Louis; and T. E. Weeks, Minneapolis, reported a series of resolutions, enumerating appropriate features for the celebration, including two papers: one, giving the "History of the Discovery of Anæthesia," to be prepared by Dr. Fillebrown, and one on "The Application of Anæsthesia to Surgery, and its Benefits to Mankind," which Dr. J. E. Garretson would be invited to prepare. Also that a banquet be given and prominent gentlemen to be invited to make addresses. All of these papers to be preserved in a memorial volume. Philadelphia was selected as the place for the celebration.

An organization committee of nine, an executive committee of eleven, and a general committee of fifty were recommended in the report which was adopted."

When a body of well-known, honorable, intelligent and scientific professional gentlemen array themselves in united action to do something, it is to be presumed that what they are doing is worthy of the intelligence and character of the profession which they are supposed to represent, and honor the cause to which it is directed.

It may appear presumptuous to some of the parties concerned that any one should call in question the wisdom, sincerity or motive of this honorable body in thus seeking to promote science by doing honor in commemoration to pertetuate the name of Dr Horace Wells. Yet, as we regard the deeds and truths pertaining to this noble science of infinitely more value than the vacilating opinions of men, we shall lay the axe to the root of this fostered tree, and endeavor to clear away this rubbish—this ignis fatuus,—

and bring to light the true character of this science, as well as the true character of the wonderful deed about to be commemorated. It is claimed by these gentlemen that the late Dr. Horace Wells, a dentist of Hartford, Conn., discovered anæsthesia; and that, inasmuch as by his diligent research he made this wonderful discovery which has proved so great a blessing to suffering humanity, the world at large, and especially the Dental and Medical professions, owe to his memory some distinguishing mark of honor.

Now let us, with the reader's kind indulgence, bring out the facts relative to Dr. Wells' relation to the discovery of Anæsthesia. It is properly admitted by all that Dr. Wells made the discovery that a tooth could be extracted without causing pain while the patient was in a state of unconsciousness or insensibility induced by the administration of nitrous oxide gas to the exclusion of atmospheric air. This discovery is fully admitted, but nothing more nor nothing less would meet the facts in the case. Nevertheless, years prior to this, it had been observed that, while in an asphyxiated condition from the use of nitrous oxide gas, persons could be seriously injured by cutting or bruising without realizing pain or but a partial sensation of it; though to make a test of that physical condition for a painless surgical operation, it is cheerfully admitted, that Dr. Horace Wells is entitled to credit. Then if this alone was such an act of merit or of such benefit to mankind, or required such diligent research, such brilliant talent, or such exhaustive study as to entitle the discoverer to an exalted position in the world of science or in the ranks of surgeons, then it is meet and right that such honor as is proposed should be conferred. Even then the honor thus conferred should be definitely specified as being for the object herein mentioned. But is this the object of this proposed demonstration? If so, then, while we may not deem this discovery of so much importance to suffering humanity as our zealous brethren of the American Dental Association, and may differ from them to the extent that we believe this discovery has brought upon the suffering as well as on the dental profession a curse; yet we would not criticize this proposed demonstration, were it not that the honor is claimed for the discovery of something which is as foreign to the *real* discovery as is possible to conceive. It is claimed by these scientific gentlemen that Dr. Wells discovered Anæsthesia, and as the discoverer of this desired physical condition for painless surgical operations, the human family and especially the Dental and Medical professions, are under lasting obligation and should honor his name by this public recognition, and contribute a fine monument to perpetuate his beneficient deed. But did our honored Dr. Wells discover anæsthesia as is claimed? If he did discover that such physical condition for surgical operations could be produced without injury or danger to life, he is certainly entitled to great credit and honor; if a man has discovered something and the object of his discovery is of very great interest to us, we certainly should know definitely what it is that he has discovered. Therefore it is pertinent that we know definitely what constitutes that precise physical condition that we have named anæsthesia; also, that we fully know and clearly understand how this physical condition differs from other physical conditions to which it bears a marked resemblance, but from which it radically differs, such as Asphyxia, Synocope and paralysis of the functions of life, etc.

We all know that the science of anæsthesia is yet only in its infancy, and consequently should apprehend that much of the nomenclature, definitions and so-called literature would be quite misleading. It was formerly supposed and recognized that any physical condition in which there was absence of sensation was a condition of anæsthesia. Thus, from this general recognition, especially in the medical and dental professions, lexicographers have defined anæsthesia as a "physical condition in which there is absence of sensation." This has led many in both professions into serious errors, and no doubt has been the primary cause of numerous deaths. For if this definition be correct and clearly defines this physical condition, then *death* is anæsthesia; asphyxia, syncope, or paralysis of the great nerve center is anæsthesia. Then if a club or electricity should paralyze the nerve center, the club or the electricity must consequently be an anæsthetic; for surely that which produces anæsthesia must be an anæsthetic. Yet, no intelligent physician would desire either agent to produce a condition of absensation for a safe surgical operation, nor would he be any more willing to recognize either agent as an anæsthetic. Hence it will be recognized at once that such definition does not define with sufficient clearness, nor would it be safe as a basis upon which to build the science. It is equally true that asphyxia is a physical condition in which there is absence of sensation, yet asphyxia is a physical condition in which the blood is deoxidized, or a condition in which the force and functions of life are *suspended* or *abrogated*.

"Anæsthesia is a physical condition in which the force and functions of life are in continuance under modification whereby absensation is produced." We cannot fail to recognize this last definition as one that distinctly and clearly defines the precise physical condition so much desired for surgery. The *force* of *life*, is *free oxygen;* or *free* oxygen (not oxygen chemically combined) is that out of which vital force is generated. Therefore, we cannot fail to recognize the fact that *true anæsthesia* cannot be produced without sufficient *free oxygen* to support combustion and sustain the functions of life, while asphyxia *cannot* be produced without depriving of this free oxygen. This is not simply theory, but demonstrated *facts* that are incontrovertible. To see the full force of the point now being made, the reader will kindly bear in mind that oxygen combined chemically with any other chemical element will not support combustion nor sustain life, either animal or vegetable. Some suppose that nitrous oxide gas supports combustion from the well known fact that when a lighted taper or a piece of red hot charcoal be thrust into a jar of nitrous oxide, an intense light and heat will be observed. They seem to overlook the fact that sufficient heat is then supplied to decompose the two chemical elements and that the heat sets the oxygen free; that it is the oxygen set *free* that supports the combustion and not the nitrous oxide gas. But there is not sufficient heat to decompose the two chemical elements in an animal, and consequently, when nitrous oxide gas is administered, it not only enters the lungs but the blood as nitrous oxide, and is eliminated as such. Therefore, when nitrous oxide gas ($N_2O$) is administered, it simply deoxidizes the blood and produces asphyxia, just as quickly and just as surely as when carbonic acid gas, or any other agent that does not contain *free oxygen*, is administered. It has been demonstrated again and again that small animals and birds cannot live, on an average, more than 1 minute and 20 seconds in any quantity of nitrous oxide gas. I do not refer to my own demonstrations alone to this effect, but to those made by The New York Medical Society, The Medico-Chirurgical Society of London, as well as by The Buffalo Dental Association, all to the same effect.

These incontrovertible facts are here set forth to demonstrate beyond the peradventure of a doubt that if a Dr. Horace Wells had discovered that nitrous oxide gas, when administered to the exclusion of atmospheric air, would produce a condition in the subject in which there is absence of sensation, the physical condition thus produced is not anæsthesia, but unquestionably is a condition in which the blood is deoxidized, and consequently is *asphyxia*, and not *anæsthesia*, as some few still claim, though admitted fully by nearly all of the more intelligent in both professions and taught in all the medical and dental schools.

Besides all the array of inevitable and incontrovertible facts disproving nitrous oxide gas to be an anæsthetic, we have equally as strong historical facts to prove that Dr. Horace Wells did *not* discover that nitrous oxide gas produced a physical condition in which there was absence of sensation. For this proof we refer the reader to the first article in this number of this journal. If Sir Humphry Davy in 1799 while Superintendent of the Medical School at Bristol, England, in studying the effects of nitrous oxide gas, and making many experiments with this "laughing gas", made this remarkable statement: "As nitrous oxide gas appears capable of destroying physical pain, it may probably be used to advantage during surgical operations in which no great effusion of blood takes place", and also stated that he had inhaled the gas while having the gum cut from an erupting wisdom tooth, can it be true that Dr. Horace Wells discovered that either asphyxia with nitrous oxide gas, or anæsthesia, or that either of these physical conditions can be produced? Scientists were experimenting with this gas for more than forty-five years before Dr. Wells suggested to Dr. Colton: "I believe a man by taking that gas could have a tooth extracted or a limb amputated and not feel the pain." Moreover, these Professors, in their popular lectures at these entertainments, were always watchful over their subjects lest they be injured, as they frequently were during their excitement, without being conscious of the fact. What, then, are we to think of the rationality of the claim made for Dr. Horace Wells as the discoverer of anæsthesia? What should we think of the men and their motives in thus attempting to urge the name of this man upon the scientific world as the discoverer of anæsthesia? Is it not, at least, surprisingly strange that, in the blind enthusiasm manifested to popularize nitrous oxide and to place it alongside of true anæsthetics they should claim the immortal honor of discovering Anæthesia for the man who had the courage to have a tooth pulled while asphyxiated by nitrous oxide gas?

In the January nnmber of one of our leading dental exchanges, —*The Independent Practitioner*,—which at this moment comes to our desk freighted with the exuberance of the erudite minds engaged in this effort to immortalize, we find the remarkable anomaly or incongruity of admitting the discovery of anæsthesia centuries previous to the noble act of the tooth pulling in Hartford, Conn., and yet claiming the discovery of anæsthesia for Dr. Wells. We quote from the address of Dr. Thomas Fillebrown, of Boston, whose duty it was made to pronounce the eulogy on this truly remarkable occasion, the celebration of the asserted wonderful discovery:

"Insensibility to surgical operations was occasionally induced many centuries ago. Homer mentions the anæsthetic effect of nepenthe, and refers to the inhalation of a vapor of hemp. Dioscorides and Pliny record the use of mandrogora. Apuleius, A. D. 125, said, 'If a man has to have a limb mutilated, sawed or burnt he may take an ounce of mandrogora wine, and while he sleeps the member may be cut off without pain or sense.' In the third century Hoa-Aho, a Chinese, gave his patients a preparation of hemp, which made them insensible to pain. Theodoric, in the thirteenth century, gave directions for preparing spongia somnifera for inhalations before operations. Ether was known as early as the thirteenth century, and described by Cordus in the sixteenth century, and the name ether was given it by Frobenius in 1730. In 1828 Gerardin read a paper before the Academy of Medicine of Paris, describing surgical anæsthesia produced by inhaling gases. In 1800 Sir Humphrey Davy made his remarkable statement, 'As nitrous oxide gas appears capable of destroying physical pain, it may probably be used to advantage during surgical operations in which no great effusion of blood takes place.' Again he says, 'Protoxide of nitrogen was discovered by Priestley, demonstrated by Davy, and practically applied by Horace Wells in 1847.'" Thus while this learned orator assigns the discovery of nitrous oxide to Priestley,he claims the application of it to surgery by Dr. Horace Wells. He admits yet that Sir Humphrey Davy during his superintendency of the Medical Institution at Bristol, England, among his various demonstrations, submitted to the cutting of the gum or muscle over an erupting wisdom tooth while deprived of sensation by nitrous oxyde gas, in which he declared there was no pain. If this was the first application of nitrous oxide gas to surgery, why not give the credit and honor (if there be any) to Sir Humphrey Davy? "Consistency thou art a jewel."

It can but seem very strange to any uninterested party that such a concerted action should be had for a demonstration to popularize, without even a shadow of evidence to convince any one, that anæsthesia was discovered by Dr. Wells. Both the speakers on the occasion of the celebration, Drs. Fillebrown and Garretson, admit that Dr. Wells did not discover nitrous oxide gas nor even its first application to use in surgery; both must admit that when administered without air it deoxidizes the blood and can only produce asphyxia, and if continued five minutes irrevocably death. As the English savant Dr. Richardson says, "nitrous oxide produces the first stage of death and its use should be prohibited by law.' Why all this array of talent to establish a false premise? Can it be a professional pride to secure a professional honor that can scarcely exist in the mind even of the most imaginative as being due? Or has this claim been ingeniously foisted upon the profession by venders of nitrous oxide gas and gas apparatuses through influence of their friends in the profession?

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DEATH AFTER TAKING GAS.—At the City Coroner's Court, Mr. S. F. Langham held an inquest with reference to the death of Frank Lee, aged twenty-five, manager to a colonial merchant, and lately living at Crowhurst Road, Brixton. Henry Creasy, dentist, 88 Newgate street, City, deposed that on Monday the deceased came to consult him with reference to having a tooth extracted with gas. He appeared to be in good health, and was put under gas by Dr. Adams, of Aldersgate street, who had previously examined him. He seemed to take the gas very well, and witness extracted the tooth. He went on breathing for about a third of a minute and then the breathing became stertorous. The doctor at once pulled the deceased's tongue forward, and he was afterward taken out of the chair and artificial respiration was resorted to. Ether was also injected, but finding that artificial respiration was of no avail, tracheotomy was performed. This also proved unsuccessful, as the throat was full of mucus, which seemed to impede breathing. After half an hour's work artificial respiration was given up, the deceased being found to be dead. Witness had carried on business in the city for the last twenty years, and had been in the habit of extracting teeth under gas during the whole of that time. Dr. Adams had always administered the gas, and with successful results.

Dr. Norman Moore, lecturer on medicine at St. Bartholomew's Hospital, who had made the *post-mortem* examination, stated that all the organs were healthy, but he found no air in the lungs and they were engorged with blood. There was also much thick mucus in the bronchial tubes, and death was caused by asphyxia. In reply to the coroner, Dr. Moore said he believed that everthing had been done for the deceased that was possible. The jury returned a verdict of "accidental sufiocation," and added that no blame attached to the dentist or doctor.— *Dental Record.*

Ed.—This startling announcement of "accidental suffocation," as the verdict of a supposed intelligent jury as to the actual cause of the death, is but another attempt to whitewash and cover up the real cause of the death and thereby shield not only the true character of the agent used, but the misdeed of the doctors concerned.

If depriving any person of the free oxygen that is necessary to sustain life is suffocating, then in the administration of the nitrous oxide gas, which does not contain any free oxygen, these doctors were knowingly and *not accidentally* suffocating, but willingly and criminally producing profound asphyxia and death, by the administration of an agent whose only mission is to produce asphyxia, and if administered long enough death, in every instance.

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The first permanent molars are the most important teeth to be preserved. The mouths of the great duct of Steno, which supply saliva to the mouth, are opposite the first molars. They are in the centre of the arch, and in the course of mastication, by the force of the movement of the jaws, we have constantly on the glands the pumping action of the masseter muscle. It forces a stream of saliva into the mouth opposite these teeth. The removal materially interferes with insalivation.

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A great many claims for the *discovery of Anæsthesia*, have been made by as many different claimants and their numerous friends without knowing the correct meaning of the word Anæsthesia, nor understanding what precise physical condition must necessarily constitute this state of being. Editor.

# AN INTERVIEW BETWEEN PATIENT AND DENTIST.

BY PROF. J. M. CLYDE, D. D. S.; M. S. A.
SPRINGFIELD, MO.

Patient,—Doctor, I understand you give "Narcotized Air" for the extraction of teeth without pain, is this something new?

Doctor,—No, sir, it is only a new name, and the proper one, for an old thing. It is simply air charged with some narcotic vapor; these mixed in due proportion constitute an anaesthetic.

Pa.—Why, I thought that chloroform and ether were anæsthetics.

Dr.—They are narcotics, but not anæsthetics. Air is an indispensable element of an anæsthetic, for without air the functions of life cannot be performed; without air it is impossible to produce anæsthesia.

Pa.—What about *gas?* It is inhaled without air.

Dr.—It is true, and that is just the reason why it is not an anæsthetic. No one can breathe pure *gas* for three minutes and live. He would be dead beyond recovery.

Pa.—Well, then, how does it produce insensibility?

Dr.—By asphyxia, or suffocation, want of air, a condition in which the functions of life are suspended. This is not anæsthesia.

Pa.—What is the difference?

Dr.—Anæsthesia is a modified condition of life closely resembling profound sleep, hence the want of sensation; but the insensibility of asphyxia is that of partial death.

Pa.—Are they not both dangerous conditions?

Dr.—Anæsthesia is not, if induced and maintained in harmony with the laws of nature, that is, if we begin with a very low percentage of the narcotic and gradually increase as the patient receives it comfortably, carrying it no farther than to the point of insensibility. But asphyxia is dangerous to both health and life. It is impossible to suspend the vital functions even for one moment without injury.

Pa.—What injurious results are likely to follow?

Dr.—Nervous debility with all its terrible consequences.

Pa.—Why, many people have taken *gas* and appear to get along all right.

Dr.—That is true. But there are a great many, especially the nervous and delicate, who date their decline of health from the day they inhaled the *gas*.

Pa.—I have noticed that persons taking *gas* turn dark, why is this?

Dr.—Asphyxia; in giving *gas*, air is excluded and the blood becomes dark, impure, from want of oxygen. It is this condition of the blood which gives the shock to the nervous system.

Pa.—Why does not the patient present the same appearance while taking "Narcotized Air"?

Dr.—Because he is supplied with all the fresh air he needs to keep the blood pure and maintain the vital process. So long as this is done there can be no asphyxia.

Pa.—Doctor, you claim that the Hayes Process of producing anæsthesia is superior to all others. How is this?

Dr.—There are two important reasons, (1) because it is based on the fundamental principle that *air* is the chief element, the *sine qua non* of the anæsthetic; (2) the Apparatus is so constructed that the percentage of the narcotic is at the command of the administrator. He can increase or diminish it at will.

Pa.—Beg pardon, but I would like to know how *air* can be the chief element?

Dr.—There are three reasons which I will name in the order of their importance: (1) the vital functions cannot be performed without air; (2) in breathing the condensed vapor of the narcotic there is danger of shock; (3) the rapid breathing of air alone will produce insensibility to pain.

Pa.—This is the second time you have mentioned shock, what is it?

Dr.—Shock is a sudden concussion or arrest of the nervo-electric currents in a greater or less degree. A *complete* arrest, means death.

Pa.—What are the causes of shock ?

Dr.—The causes of shock nearly all are embraced under two heads, viz., (1) internal, the mind; (2) external, the agent used. The internal cause is the most difficult to control. Suppose you have a very delicate, nervous, timid patient with active imagination, you have one very liable to mental shock. Death from fright, hearing sad news, seeing a terrible tragedy, etc., causes internal shock resulting in fatal syncope.

Pa.—Can this be avoided ?

Dr.—It can, provided the anæsthetist can obtain control of the patient's mind. In such a case he should tax his ingenuity to dispel fear and inspire confidence. He should strive for a complete surrender of soul and body to himself. This is the sheet-anchor against mental shock.

Pa.—What about external shock ?

Dr.—It is only necessary to say that it is an inpossibility by the Hayes' Process, provided the operator has the requisite knowledge of anæsthesia. The percentage of the narcotic is under his absolute control.

Pa.—Can this Process be used in general surgery ?

Dr.—Yes, sir. It is used by some of the best surgeons in the United States, and they speak highly of its merits.

Pa.—Can it be used in preparing sensitive teeth for filling ?

Dr.—It can with great comfort to the patient, and that, too, without carrying it so far as to deprive him of the knowledge and ability to manage himself.

Pa.—How does it compare with others in regard to safety?

Dr.—It is beyond comparison. Nearly 500,000 patients without discrimination, or any examination as to the condition of heart and lungs, have been anæsthetized by this Process without a single death. The record is unparalleled.

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Reader, this interview presents nothing new ; but in order to make us perfect in any science we need line upon line, precept upon precept, here a little and there a little. This is my apology.

# AN INTERVIEW WITH AN EXPERT ON ANÆSTHESIA AND HYPNOTIC ANÆSTHESIA.*

Having learned of the new departure in teaching and practicing what is commonly known as Anæsthesia and Hypnotic Anæsthesia in the new School chartered and in full operation under the laws of Illinois,and known as The School of Anæsthesia, with authority to confer the degree, M. S. A. (Master of the Art and Science of Anæsthesia), with a faculty of six reputable physicians and dentists, thoroughly competent in their respective specialties, pertaining to this science, our reporter called to learn more of the character, object and aim of the School. Having secured the consent of Dr. S. J. Hayes, secretary of the faculty, for an interview, the following result was obtained which may be of interest to our readers:

Reporter,—Some of the lectures delivered in your school having been published, fell under my eyes and were read with more than ordinary interest, notably, those delivered by yourself, Dr. Charles Gilbert Davis, and Dr. J. M. Clyde, in which there seems to be reduced to a practical solution the difficult problem of producing that much desired physical condition of artificial sleep, known as hypnotism or anæsthesia for painless surgery and dentistry without endangering life and health. Will you kindly explain to the readers of our paper, how these results are obtained?

Dr. Hayes,—This may be a very difficult task, and especially so to explain to the laity who may not be conversant with many terms employed to express the thoughts in reference to this important art and science, yet I will undertake the same with your kind indulgence.

If I were to state that a true anæsthetic or hypnotic has never killed any person or animal, nor ever will kill, I would invite the censure and condemnation of the larger portion of both the medical and dental professions, and I should be pronounced heterodoxical, erratic and unworthy

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*Reported for the *Dispatch*, of Chicago.

the confidence of an intelligent public, and yet for the better development of this (to me) *all important* art and science and for the benefit of suffering humanity, I will risk my reputation in this statement, and shall endeavor to prove the premises to be correct and perfectly tenable and reliable. But this I will not undertake to accomplish in one brief interview.

Reporter,—Doctor, you may have all the time and space you desire; we shall only ask that you be as brief as possible, consistent with a proper presentation of the subject and its importance.

Dr. Hayes,—You are very kind and considerate,and I shall endeavor to comply. That this statement is literally true, we challenge the scientific world to disprove. While, at the same time, we shall endeavor to prove within the comprehension of any person who will follow closely in our line of thoughts, that the premises here laid down are literally and veritably true, and without even the possibility of a serious doubt. In so doing we shall remind the reader of the axiom—"Never a result without a cause"—never a death without a cause—never the cessation of the functions of life without the paralyzation of the nerve centre, or brain and medulla. This paralyzation of the great nerve centre can only be accomplished in one of two ways.

Reporter,—Pardon me, but that you may be properly understood, what do you mean by the paralyzation of the nerve centre?

Doctor,—Then, that I may be clearly and definitely understood, allow me to remind you that there is a circulating system within every animal independent and yet not independent of the arterial and vein circulation, and upon which arterial and veinous circulation depend. This circulation unquestionably is within the nervous system. The great heart of this circulating system is the brain (which is also the seat of the immortal mind or spirit), which by the cerebral glands secretes or generates a fluid which Dr. Bove Dodds denominates nervo-vital fluid, but which to my mind is better represented by the term animo-electricity. This electricity must pass out from the brain and medulla through all the motor-nerves just as the blood is sent out from the heart through the arteries, otherwise not a function of any organ can be performed, and it returns again to the brain through the sensory nerves, as the blood returns through the veins to the heart, otherwise not an impression from this world can be received. That this is self-evident and must be recognized as an absolutely correct basis upon which all medical science and treatment should rest, no man of thought will risk his reputation to controvert. Whence cometh the force that enables the vital organs to perform their functions?

Reporter—Is not life that force?

Doctor—Life is not force, neither is force life, but *force* may make life manifest. It may be the agency through which life is developed or made manifest. It is conceded by scientists that there are but two primary elements in the material world—force and matter—that all material force is a unit having different forms of manifestations, or co-relations, convertible into each other, as heat into light, electricity into neural force, etc. Material force,and that alone can move matter. But beyond and above this material force, is another force, which must be recognized as psychic force,—force of mind, or spirit. This force is beyond the realm and above the comprehension of this material world, and yet manifests itself, and can only manifest itself by operating upon and through material force. Thus the spirit or mind will execute in and of itself, but can only make the executions manifest by operating upon and through material force upon matter. Thus thoughts are conceived and executed first in the mind and then executed or made manifest to others by the mind or spirit operating upon the precise cell of the brain (or battery) in such a manner as to send out in the precise motor nerves, that are wont to move certain organs, the electric current to develop the force necessary to move the organs, and thereby the organs are moved. The heart and the lungs can only perform their respective normal functions when this material force is thus developed regularly. Therefore, any interruption of these neural currents must necessarily interrupt the functions of these vital organs. I know of but two agents that can interrupt these currents; the one is internal—the mind,—the other external, chemical, or mechanical. And in no other way can these currents be interrupted.

Reporter,—Do you mean to say that the functions of these vital organs cannot be interrupted, accelerated or retarded, only by these two agents?

Doctor,—I wish to be distinctly understood as saying that there can in no other possible way be any cessation, acceleration or even modification of these functions only as by one or the other of these agents, or by a combination of both.

Reporter,—But your reference to the agencies producing certain results in this nerve circulating system, does not yet make clear to my mind the manner in which this paralysis of nerve center is brought about. I recognize the fact that you are pointing out the actor, but have not referred to the action. Kindly tell how the result may be produced?

Dr. Hayes,—I have now directed you to the cause or causes of this result—paralysis of this nerve center must always precede the death of any animal or man. If you will bear with me, I will now explain how this result must necessarily be produced; and bear in mind that this result cannot be brought about in any other way. We have said that it must be the result of the action of one or the other of the two agencies or by both combined. Then these agents can only produce this result in one or the other of two ways; either by robbing the battery, (the brain), of free oxygen, which is the *force of life*, or that out of which vital force is generated by the cerebral glands of the brain and pneumogastric glands of the lungs. This can be accomplished either by deoxidation of the blood, as in the administration of nitrous oxide gas, or carbonic acid gas, or anything that does not contain free oxygen, or sufficient free oxygen to support combustion and sustain life; or you may have the same result by taking away the blood, which is the same cause virtually—asphyxia, or anæmia, or both. The action is a gradual diminution or cessation of vital force. The other mode is by producing what is commonly called a shock. It is concussion and revulsion in neural circulation, which result is paralyzation. This concussion and revulsion can only be produced either by the mind, or by chemical and mechanical agencies, or by both. If there be any other way that this result can be obtained, I shall be most happy to learn of it.

Reporter,—I now already apprehend why it is that a true Anæsthetic will never kill. Is it not true that a true anæsthetic will never produce the necessary shock to paralyze nor produce asphyxia?

Dr. Hayes,—Your apprehensions are correct, sir; a true anæsthetic should be generated and applied simultaneously in such a manner as not to produce either a shock from the sudden induction of an over percentage of the drug by first inhalation, nor by over-charging the atmosphere with the narcotic, so as to exclude the necessary quantity of free oxigen to sustain life. If it be thus generated and applied, there never can be a death from the anæsthetic.

Reporter,—Your argument seems very conclusive, and I confess that I cannot see myself how it can be possible to have a death from an anæsthetic, if neither asphyxia, nor shock can be produced. Do you mean to say that when a true anæsthetic is administered there can be neither a shock or concussion and revulsion in neural circulation, nor asphyxia produced?

Dr. Hayes,—I most assuredly and emphatically do so state, and that if neither asphyxia nor shock is produced there cannot be a death resulting from the action of the anæsthetic.

Reporter,—But are not chloroform, ether, Bi-chloride of Mythelene, etc., true anæsthetics? They are so called, and yet very many deaths have been reported from their use.

Dr. Hayes,—It is true, that these drugs are generally called anæsthetics, but, in point of fact, they are not true anæsthetics.

They are only suitable narcotics, or hypnotics, which may be used as subordinate elements in a true anæsthetic. In order that you may understand what in reality constitutes a true anæsthetic, it will be quite necessary that you recognize what precise physical condition constitutes anæsthesia. Then any agent, which when properly administered, will produce this physical condition, must necessarily be a true anæsthetic; and any agent which, when administered, will not produce that definite physical condition, cannot be a true anæsthetic. This no man will attempt to controvert. The failure on the part of the medical and dental professions to recognize the necessary physical condition that properly constitutes anæsthesia, I regret to say, has led to numerous blunders and thousands of deaths.

Pardon, I must adjourn this interview abruptly right here, as I am reminded by my time-piece that I have other pressing engagements that I must give immediate attention to, and yet, as this interview leaves the subject where information is most desired as to the errors taught, I shall be pleased to have you join me again in this pleasant review, when I may have more time and when we will take up the subject again just where we leave off, and give true definitions for anæsthesia, asphyxia, syncope, etc., and then conclude with the citation of facts.

Reporter—I shall be most happy indeed to call again to pursue your instructive line of thought. You have already upset many of my former ideas in regard to anæsthesia, and I hope to be personally greatly benefitted, though only a layman. Thanking you for this interesting interview I bid you good-day.

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This reportorial interview will be continued in next number of the DENTAL and SURGICAL MICROCOSM and the correct definition of Anæsthesia, Asphyxia, etc., will be brought out, these physical conditions contrasted, compared and dwelt upon in such manner as to be clearly manifest. If you want the correct knowledge of this important science subscribe for this Journal.

# COMMENTS

BY DR. S. J. HAYES.

## A NEW APPARATUS FOR MAINTAINING ANÆSTHESIA WITHOUT A FACE-PIECE, AND WITH THE MOUTH OPEN.*

BY DR. THOMAS FILLEBROWN, BOSTON, MASS.

The necessity of repeatedly re-anæsthetizing the patient has always been a great and serious hindrance to the progress and success of surgical operations within and about the mouth and throat. My own experience in operating upon the palate and lips led me to consider the possibility of maintaining the narcosis without interfering with the operation. I am pleased to announce the accomplishment of this object.

Several anæsthetists have used etherized air in inducing and continuing anæsthesia. Clover used chloroform in this way many years ago, and later applied ether the same way. Messrs. Codman & Shurtleff, of Boston, produced an apparatus for this purpose some years ago.

The working of all of the inhaling instruments depended upon the force of the inspiration of the patient to draw the air through the ether, and all except Codman & Shurtleff's provided for the patient to expire back into the instrument.

About two years ago Dr. Horace Packard used a compressible bulb to force the air through the ether, and thus made a very great improvement over the old method; but this still allowed the respiration to pass back into the instrument. The observations of the workings of this inhaler led me to the conception of an apparatus to accomplish the much-desired object of anæsthetizing without sponge, towel, or face-piece.

My apparatus consists of a bellows, connected by rubber tubing with the long tube of a twelve-ounce wash-bottle, with a stop-cock intervening to regulate the flow of air. From the bottle extends a half-inch rubber tube to the patient. The bottle is filled one-third full of ether. The

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***International Dental Journal*, October, 1893.

bellows is inflated and the stop-cock opened so as to allow the air to bubble up freely through the ether, and to become saturated with ether vapor. The etherized air is then discharged through the second tube a few inches from the patient's face.

This application of ether will maintain complete anæsthesia for any length of time, and not interfere in the least with any operation in or about the mouth; nor will the surplus vapor discharged into the air sensibly affect either the operator or the assistants.

I have maintained perfect anæsthesia for half an hour in one case to one and one-half hour in another case, without intermitting the operation at all on account of the anæsthesia. This method is not wasteful of ether, as less than one-half pound continued the narcosis the hour and a half; but the waste I should consider of no account as compared with the great advantage gained.

I have made a still further modification of the instrument, and adapted it to the induction of initial anæsthesia, and its maintenance with face-piece for use in general surgery.

All ether inhalers now in use, allow all the exhalations to be forced back into the instrument; consequently the patient breathes over and over again the same atmosphere and becomes more or less asphyxiated, instead of truly anæsthetized. Such a plan seems to me unscientific, uncleanly, and unhealthy, in every way undesirable.

To avoid this condition, I have attached to the discharge-tube of the apparatus above described a double-valve face-piece, such as is used for the administration of nitrous oxide, and a double-end gas bag for a reservoir. By this means the patient is insured an abundance of pure anæsthetic atmosphere for each inhalation.

At the suggestion of Dr. T. M. Dillingham, I first filled the bag with pure air, and by slowly injecting the etherized air, narcosis is induced with absolute freedom from any of the disagreeable symptoms usually experienced when etherization is accomplished.

I have since found that the same object is better accomplished by raising the tube in the bottle until it is entirely free from the ether filling the bag, and commencing the inhalation. In this air, there will be but a very little ether. Then gradually slide the tube down into the bottle, and as it approaches the ether the strength is increased , after one-fourth of a minute the patient can breathe the full strength.

If the mouth is to be operated on, when anæsthesia is complete disconnect the bag and face-piece and proceed as before described.

Ed.—By a careful reading of the above excellent article by our genial friend, Dr. Fillebrown, it will readily be noted that he is on the right track and has already scented the goal. He has truly pointed out the defects in the inhaling devices referred to, and, with equal force, describes the advantages of an apparatus which he claims to have invented and which appears to be only a modification of the Apparatus adapted to the use of the Hayes Process of Anæsthesia. While possessing some of the essential advantages of the Hayes Apparatus, it fails in most of the principal points in developing and administering a true and radically safe anæsthetic. Consequently, the ingenious devise of the worthy Doctor, is not only an *infringement* on the Letters Patent covering the Hayes Process and Apparatus, but falls short in the principle essentials, in as much as it makes no definite arrangement for regulating and registering the percentage of the narcotic in the anæsthetic, nor for determining the same ; nor yet for adapting the percentage to meet the ever varying needs of the patient in all the stages of anæsthesia. There is no bath, nor heating device to regulate the temperature, and, as the capacity of the atmosphere to take up and carry any liquid depends on its temperature, the percentage of any narcotic in the anæsthetic, will largely depend on the temperature, since the air will never take up and carry beyond its capacity. For instance, at 60 degrees Fahrenheit, it will take up and carry twice as much of any narcotic as it will at 40 degrees; and at 90, twice as much as it will at 60. Hence, the importance of this regulating device. Then the thermometer to register the temperature, and the dial with index to regulate and register the percentage of the narcotic in the anæsthetic, *all* these are not found in the apparatus of Doctor Fillebrown. Therefore, even with his ingenious device, it is impossible to know whether or not you have a true anæsthetic.

Bearing in mind there can be no true anæsthetic without containing and administering enough *free oxygen* to support combustion and sustain life, and without containing sufficient amount of air to reduce the percentage of the narcotic (such as chloroform, ether, etc.) to a minimum that will prevent shock from the chemical and pathological effects of the narcotic on the tens of thousands of nerve filaments spread over about 1,400 square feet of surface, as is estimated in an ordinary sized man's lungs, by reflex action on the brain and medulla, we at once see that, whatever be the merit of Dr. Fillebrown's modified device, it *entirely fails* to reach the line of *safety*, because it does not *invariably* produce and administer a *true* anæsthetic, and consequently produce, on the part of the patient, a true state or condition of anæsthesia.

The infringement in the device of Dr. Fillebrown, on the Letters Patent covering the Hayes Apparatus, is in the "use and combination of an air-forcing device" for the purpose of simultaneously generating and administering a true anæsthetic to be inhaled. Also, its combination with a rubber or other flexible tube for the same purpose, as well as in the combination of the rubber tube with another tube, immersed in the liquid narcotic for the purpose of evaporating, and also, the combination with a face or mouth piece. All of these are secured by Letters Patent, Nos. 257,866 and 509,848, in the Hayes Apparatus for the use of the Hayes Process of Anæsthesia.

Reference is here made to the statements and device of Dr. Fillebrown for the double reason of showing how carefully he has guarded against any allusion to the Hayes Apparatus, while all the valuable features of his device are found in this apparatus, and to emphasize the fact that the doctor highly values these same essential features ; hence he should the more highly value the Hayes Apparatus and Process of Anæsthesia ; a Process strictly unerring and possessed of *all* the elements of safety, economy, cleanliness, efficiency, convenience, and the securing of a true anæsthesia, wholly without the ordinary unpleasant results of nausea or irritation, and without filling the operating room with a disagreeable odor.

## NITROUS OXIDE GAS A NON-SUPPORTER OF COMBUSTION.

BY PROF. J. M. CLYDE, D. D. S., M. S. A.

Buxton in his work on anaesthetics, 2nd Ed. pg. 27, speaking of Nitrous Oxide says, "This gas agrees with oxygen in many of its chemical properties, thus it supports combustion when ignited bodies are plunged into it." This statement appears true and on this account, is misleading, but it is not true. Nitrous oxide, *as nitrous oxide*, does not support combustion any more than carbonic acid gas. It is true that a piece of ignited charcoal plunged into it will burn with great brilliancy. This is because the heat of the ignited coal is sufficient to decompose the gas, and the *oxygen* being set free, combines with the coal and supports the combustion. Were it not for the decomposition of the gas, the ignited coal would cease to burn just as surely as if put into a jar of carbonic acid gas. Nitrous oxide requires a high heat to decompose it. Animal heat is far from being sufficient, hence it will not support life.

As Nitrous Oxide gas neither supports combustion nor sustains life, either animal or vegetable its use as Dr. Richardson says, "should be prohibited by law."

# THE PSYCHOLOGICAL ASPECT OF HYPNOSIS.

BY WM. ROMAINE NEWBOLD, PH.D.[1]

MR. PRESIDENT, LADIES AND GENTLEMEN,—In responding to your invitation to present to you the psychological aspect of hypnosis, I find myself confronted by sundry difficulties. The phenomena in question, are exceedingly complex, and it would be impossible to give an adequate review of them in the scanty time at my disposal. In the second place, they have engaged the attention of the scientific world but a few years, and many reported phenomena cannot be regarded as incontestably established. And in the last place, there is no consensus among psychologists as to the construction that is to be placed upon them.

The theories, psychological and physiological, that have been proposed to account for hypnosis, are very nearly as numerous as the theorists, and not one has met with universal acceptance. Yet we are by no means relieved of the responsibility of framing hypotheses. Scarcely ever has a great scientific generalization been established that was not constructed out of the ruins of a thousand hypotheses, and unless those thousand hypotheses had been devised, tested, and successively found wanting, we would never have had the material out of which to construct the true explanation. It is in this light that I regard the theory which I shall have the honor of putting before you to-night. It is based upon the facts of hypnosis chiefly as observed and reported by the school of Nancy, which my own limited experience has in every respect confirmed, and is most nearly akin to that of Dr. Despine. It is an effort to bring the facts of hypnosis into line with the psychological doctrine of the dynamic mental state, a doctrine, which was, I believe, first taught clearly by Herbart, but for which a satisfactory scientific foundation has been but recently supplied by the researches of neurologists into the functions of the cerebral cortex. Scanty and disputable as our knowledge on these points is, there is a substantial agreement between the main results of introspective observation on the one hand and clinical observation and direct experiment on the other which is exceedingly encouraging.

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[1] Lecturer on Philosophy, University of Pennsylvania.

You will readily understand that within the limits of this paper I can do no more than state and make plain the leading features of the tentative theory upon which I am now working. It is a theory that brings the chief phenomena of hypnosis into harmony with fundamental psychological principles and with the fundamental principles of cerebral physiology as far as I understand them, but which must undoubtedly suffer extensive modification as our knowledge of mind and brain progresses. I shall, however, in concluding, point out some of the dangers attending the practice of hypnotism and say a word as to the relation often supposed between hypnotism and telepathy.

It has long been known that certain individuals can be put by the use of definite agencies into a condition closely resembling sleep, but differentiated from it by sundry traits. These agencies are numerous, but all agree in involving the checking of the train of ideas, the restriction of attention to one idea or sensation, or to a constantly recurring but narrowly limited series of sensations, such as is given by passing the hands before the patient's eyes, by light touches or stroking, by rotating the head upon the shoulders, and so on. After the lapse of a time that varies in different individuals from a few seconds to thirty minutes or more, phenomena closely resembling sleep supervene. The eyelids become very heavy; they close; the field of consciousness becomes narrower and narrower, wanes, and finally disappears. When the patient awakes, he believes that he has been asleep. But we can show that he has not been asleep in the ordinary sense of that word. He is nearly always cataleptic; his limbs tend to retain any position impressed upon them by the operator. He appears to be keenly alive to all that the operator says and does, but has neither eyes nor ears for any one else. This is the so-called phenomenon of *rapport*. He is frequently partially and sometimes totally analgesic. Pin-pricks and pinches are felt as touches, and burns as warmth. Sometimes, although not as often, he presents hyperæsthesia of sundry senses. He can read fine type at a considerable distance, can hear sounds that he cannot hear in the normal state, or can distinguish the compass points when very near together. But the most marked and most constant symptom is his absolute obedience to the word and wish of the operator. If told that he cannot open his eyes, cannot bend his arm, he cannot. If told to open his eyes, he opens them; if told that an elephant, a ghost, or anything else you please is before him, he sees it; and similar hallucinations can be produced in all the other senses. Negative hallucinations can also be produced. The operator can by a word destroy sight, hearing, touch, and other senses, or can make the patient blind to one object or person, deaf to one sound, or the voice of one person. Nor is it necessary that the suggestion be executed while the patient is in this abnormal condition. It may be executed hours, weeks, or even months afterwards. Sometimes the patient passes spontaneously while executing it into the condition in which he was while it was given, and he is then usually not aware that he has done it. Sometimes he does not so relapse, but executes it in his normal state, and then he will often devise all manner of plausible pretexts for his action,—anything, indeed, will he allege except the true reason, and that he rarely suspects. Finally, and this is a most characteristic symptom, no matter how deeply he appears to sleep, he can nearly always be awakened by a word. If I leave the patient undisturbed for a time while thus apparently asleep, all these phenomena usually disappear. He is no longer cataleptic, analgesic, hyperæsthetic, or suggestible; he is no longer *en rapport* with the operator, can no longer be awakened by the simple command; in other words, he is truly asleep in the ordinary sense of that word. Sometimes, however, if left to himself, he will awaken spontaneously, and no evil effects follow. He may feel a slight drowsiness, lassitude, or chilliness, such as we often feel when awakened from a nap, but nothing of a more serious nature need be feared.

I have described to you the hypnotic state in its most marked form,—that which is known as deep sleep, or lethargy. About 20 per cent. of all normal and healthy adults, if we accept the conservative estimate of Dr. Moll, can be put into this condition. Of the other eighty-odd per cent., about twenty or twenty-five per cent. are not at all or but little affected by the agencies which I have described. A slight drowsiness and weight in the eyelids they will probably feel, but no more. The remaining fifty-five or sixty per cent. are affected in various ways and to various degrees. Hardly will any two individuals present exactly the same phenomena, and scarcely any two writers agree upon the degrees that are to be recognized. Dessoir recognizes two, Charcot three, Forel three,—but his three do not coincide with those of Charcot,—Liebeault six, Chambard six, Bernheim nine, etc. Of these, the two proposed by Dessoir seem to me worthy of note. In the first grade only the power of originating voluntary movements is affected. Consciousness remains undisturbed, but the voluntary muscles are more or less withdrawn from voluntary control. The smaller and more highly specialized groups, such as those controlling eyes, lips, tongue, and fingers, are the first to be affected, then the larger groups. Suggestions affecting these muscles will then be executed, but hallucinations cannot be produced, nor will post-hypnotic suggestions be executed. In the second grade both the sensory and motor systems are affected and are subject to the suggestions of the operator. This is usually found in lethargy, but frequently without it. In the first grade only the functions connected with the efferent nerves are affected, in the second those connected with the afferent as well.

It is agreed by all observers that the most characteristic trait of hypnosis is the heightening of suggestibility. To this, catalepsy, automaton-like obedience, and the production of hallucinations can be reduced. Spontaneous analgesia and hyperæsthesia cannot be reduced to suggestibility unless the operator has carelessly dropped some remark in the presence of the patient indicating what he expects to find; yet in explaining suggestibility we shall, I think, find the clue to the explanation of these phenomena also.

Suggestibility is found in all normal individuals. Volumes have been written in illustration of the fact that the mere lodging of an idea in a man's mind is of itself a certain momentum tending to affect his action. It may take root and grow, or it may seem to have fallen upon barren soil and produce no effect. The world-wide phenomena of unconscious imitation, the influence which we unconsciously receive from our surroundings and exert upon one another, the curious epidemic manias of the Middle Ages, the periodic epidemics of crime, of which we have recently had several, all these are illustrations of the fact that the suggested idea is a momentum that has its own weight, which may indeed be overpowered, but which must always be taken into consideration. Now, in all degrees of hypnosis and in many conditions not classed as hypnotic the force of the individual idea is greatly exaggerated. In the most extreme cases it is no longer one of many momenta: it is the controlling power which seems to fatally determine what the man shall do, and even what he shall see and hear. Of such a man we say that his suggestibility has been heightened.

The explanation, therefore, of hypnosis, from the point of view of the psychologist, turns chiefly upon the explanation of suggestibility, and upon that we must for the present concentrate our attention. If suggestibility is characteristic of the normal man, its explanation must be found in the fundamental laws of mind and brain. We must then determine what conditions limit suggestibility in the normal state, and in what way we may remove these conditions and heighten it.

I must now ask your indulgence for a few minutes as I leave the problem of hypnotism proper and endeavor to sketch the main outlines of a psychological theory or method which we find to-day very wide-spread among neurologists, and rapidly gaining ground among those psychologists who bring to their proper work some acquaintance with physiology an- pathology. According to this view all mental states are accompanied and conditioned by physical processes in the cerebral cortex. Upon this there is substantial agreement, and it may be regarded as the fundamental postulate of physiological psychology. Its converse, that every cortical process is accompanied by a mental state, is still disputed. If we admit this fundamental postulate, we are compelled to admit its corollary also,—that all the laws that govern mental states must admit of expression in physiological terms. And this corollary is fully borne out by the facts, as far as we are able to observe them. We must, then, learn to look upon the mental state precisely as we look upon all physical things. Scientific research in the physical world resolves itself into an inquiry into the causes and effects of phenomena, and the case is not otherwise in the mental world. The mental state must have its cause and its effects as certainly as the processes with which it is connected must have their causes and their effects. Its causes and effects need not form clearly distinguishable portions of the warp and woof of our conscious life. They may lie in the dim region that we call subconscious; but they exist, and if our knowledge were exact, we could reason to them deductively with infallible certainty. Now, when we examine our mental states narrowly, we find that even in all the complexity of consciousness we can frequently trace out their causes and effects. Let us examine a few of these cases.

Every mental state is susceptible of development. Its dimmest and least developed form is that of the nascent idea just emerging into consciousness. Its most developed form is found in the vivid sensation which is qualitatively like that idea. This intensity is primarily determined by the intensity of the central or centripetal stimulus by which the corresponding cortical process is awakened; but it also depends upon the cerebral constitution of the individual and upon sundry other conditions.

Mental states have effects. Their ideational effects have long been known to psychologists, and studied under the name of association of ideas. I need do no more than allude to this common phenomenon of subjective life. They have also motor effects. The relation of the vaso-motor system to the mental state is no new discovery. The blush of embarrassment, the pallor of fear, fainting at the sight of blood, are trite illustrations. Recent investigations have shown, however, that the connection between mental states and the distribution of the blood-supply is of the most thorough going nature imaginable. Mental states also affect the voluntary muscles directly. To Alexander Bain belongs the honor, I believe, of having first established the relation of the motor idea to the production of the movement which it represents. The effect exerted by mental states upon the secretions of the skin, upon the salivary, mammary, and other glands, is a matter of daily observation ; but their effect upon the processes of nutrition and repair is by no means as common or as universally admitted. Yet it seems to me that we have sufficient experimental as well as clinical evidence to warrant our admitting the existence of such effects, although we do not as yet understand the nervous mechanism by which they are produced or the conditions under which they operate.

Not only have mental states positive, they have also negative effects. These negative effects are generally grouped under the term "inhibition." They are exceedingly obscure. The development of any mental state seems to affect unfavorably the development of simultaneously nascent but independent states—a phenomenon commonly treated by psychologists under the title "passive attention." Individual sensory states sometimes seem to arrest one another directly, perhaps by a species of interference. Motor states can certainly check one another. Into these and kindred questions I shall not at present enter. I have, I hope, said enough to illustrate the fundamental law of which I speak,—that mental states, representing to us cortical processes of whose precise character we are wholly ignorant, must be regarded as belonging to the orderly system of nature quiet as much as those cortical processes with which they are connected, and that we are entirely justified in ascribing to them those dynamic characteristics, those causes and effects which we ascribe to all physical phenomena. And into those characteristics, causes and effects it is the business of the psychologist to inquire.

It is evident that in an inquiry into the causes of any such state or process we must go over very much the same ground as we have gone over in dealing with its effects. It may be caused *ab intra* by the operation of such antecedent states and processes as I have just described, or it may be caused *ab extra* by some sense perception. In general we term all states originated from without "suggestions," and originated from within "auto-suggestions." Of all the agencies by which I can originate an idea in the mind of another none is as certain and as definite as language. Hence we commonly think of the suggested idea as having been suggested by words ; but this is only accidental, not essential.

We have now completed our rapid survey of the dynamic mental state regarded as representing to us a cortical process. But it is evident that I have been presenting to you rather rare phenomena as illustrations of what I conceive to be one of the most fundamental laws of consciousness, and you may justly ask why this law, if it be ever operative, has so long escaped attention. The answer is not far to seek. If only our mental states existed singly, and each were free to develop itself and work out its own results without prejudice to or from other states, there would be little difficulty in determining what those results are. But in all normal states of consciousness the nascent mental state or cortical process finds itself in the midst of countless other subnascent, nascent, or definitely developed states, which it must modify, and by which it must suffer modification in countless and infinitely complex ways. It is, therefore, very difficult in the normal state to isolate any state sufficiently to distinguish its results from those of others.

Moreover, there exists in consciousness an activity of which the would-be scientific psychologist, anxious to bring all mental phenomena under mechanical or dynamic laws, usually says as little as he may. And certainly at our present stage of knowledge it is impossible to analyze it into any component factors or to determine the laws of its operation. Yet we cannot well ignore it, since it is the most constant and most powerful single factor of conscious life. This is what we call the consciousness of self. Sometimes it appears to be latent, and the man reacts upon the stimuli presented to him with almost fatal certainty. But then, again, it appears, and forwith introduces into the train of ideas and movements an element of capriciousness that was not there before. When it is thus present and exerts its influence over our actions we are said to act voluntarily. The character of this conscious self is largely determined by hereditary influences. But it is also genetically related to the permanent factor in past experience, and may even be described as a function of that permanent factor, since any extensive changes in the latter are sooner or later followed by changes in the consciousness of self. We are, I think, justified in believing that in this at present mysterious inner activity we see the present conscious representative of the net aggregate result of our own past experience, and to some extent that of our ancestors, confronted with and acting upon the nascent and mental state.

We are now in position to form a more clear conception of what is meant by suggestibility and to point out the chief factors that normally limit it. When we say that suggestibility is characteristic of all men, we mean that any mental state tends to develop to a certain degree and to produce certain definite results. This tendency is not, as a rule, very noticeable for two reasons: in the first place, any given mental state is but one of many, and we can rarely separate its results from those of others; and in the second, it is always exposed to modification by the most powerful and least understood element of consciousness,—the self. I have also tried in passing to indicate those physiological conceptions to which this psychological theory is most nearly related, and, if there be any truth in them, it is evident that the condition which we find in the normal man implies an inconceivably complex inter-correlation and functional co-ordination between the several portions of the cortex and between the organized systems of processes which we must conceive as existing within it.

Under what conditions, then, does suggestibility become heightened? Heightened suggestibility is found occasionally as a spontaneous phenomenon. Pierre Janet has, for example, a patient who is as suggestible in the waking state as most persons are in hypnosis. She has never been hypnotized. It is sometimes found as one of the effects of certain drugs, among which are alcohol, ether, morphia, and chloroform. More light is much needed upon the question. Many dreams are due to the suggestions given by strong stimuli, which penetrate to the brain and arouse smouldering cortical processes, which pursue their devious way unhampered by the restraints of waking life, hence the frequently grotesque and unreal character of dreams. It is sometimes possible to cause a person to pass from normal sleep into a condition of heightened suggestibility that cannot be distinguished from hypnosis. An analogous state frequently occurs spontaneously, and is known as somnambulism. But of all the means of heightening suggestibility with which we are acquainted, none is as easy of application and certain in its effects as the concentration of attention and limitation of the conscious field; and those effects are, as far as the subject can describe them, precisely what our study of normal conditions has led us to postulate as the chief requisite to the production of heightened suggestibility. Sometimes the entire field of consciousness appears to fade away. Then we may suppose that the only things in consciousness are the isolated ideas which the operator suggests. In others the definite heterogeneity of normal life gives place to a dreamy state in which the vivid active self seems to have retired from the field. In others the self-consciousness remains, but finds itself so weakened that the commands of the operator appeal to it with irresistible power. This enfeeblement or destruction of the self is the most characteristic phenomenon of hypnosis, and is the chief reason for the heightened suggestibility. The nascent mental state finds the chief obstacle to its independent development removed, and we can study that development and its effects under new conditions.

We must not, however, assume that the development and effects of the mental state in hypnosis are what they are in normal life, or what they would be in normal life were we able to remove other influences without in any way modifying the intrinsic character of the state which we wish to study. The checking or stilling of self-consciousness, is the most characteristic change of hypnosis, but is by no means the only change; and the other changes which are found in different subjects are so numerous that it is impossible to describe them. One of the most common symptoms is what may be described as a species of mental inertia. An idea which in the normal state would awaken a mass of associated ideas, and thus give birth to a long train of ideas, will fall dead and inert in the hypnotized mind; it seems to have spent its energy in getting to existence. But occasionally the exact contrary is observed. A mere hint from the operator lodging in the sensitive brain of the subject will be spontaneously developed into a tragedy or comedy, as the case may be, and be acted out with a vivacity and power of which the normal individual would be incapable. In these and other personal peculiarities, such as the spontaneous analgesia and hyperæsthesia which I have mentioned, we may recognize variations in the distribution of cerebral activity of whose exact character we cannot form even a conception, and which doubtless rest upon organic and dynamic peculiarities in the cerebral constitution of the individual.

What cortical modification are we to conceive of as taking place in hypnosis? This is a question that is more easily asked than answered. I think we may say with some confidence that the normal cortical co-ordination of waking life is profoundly modified. This is indicated by the inhibition of the activity of the conscious self and the spontaneous alterations in sensation. But if we ask further just what portions of the cortex are chiefly concerned in this modification, it seems to me impossible even to propose a theory. We do not know whether the voluntary activity of the self is definitely related to some cortical area, as the various special senses are, or whether it is related to some cortical layer as supposed by some, or whether it is related to some organized system of processes distributed through the entire cortex. And as this is the psychical activity which is most profundly modified in hypnosis, we may suppose that those portions of the cortex which are concerned with its manifestation are those chiefly modified in hypnosis. Yet, as I have shown, we have reason to suppose that other changes take place whose exact character we do not know at all. If, however, we ask to what other changes this modification of the processes connected with the manifestation of self-consciousness are most nearly related, I think we may say with some confidence that they are most nearly related to the changes that normally take place in sleep. In normal sleep the continuous ebb and flow of molecular change that accompanies waking life slowly and irregularly comes to a stop. Some little may remain in various portions of the brain, but it is for the most part in a state of comparative quiescence. In hypnosis we have reason to think that a similar stilling of the molecular activities begins to spread throughout the brain. In some way which we cannot now explain, the fixation of attention and voluntary limitation of the conscious field inhibits the activities connected with the conscious self first. If we leave the patient to himself these activities will either reassert themselves, or else the same change will spread on throughout the brain until the patient is in a normal sleep. And in the case of some persons this is the only effect that we can produce, by the use of the agencies which induce hypnosis in others. But if we do not leave the patient alone, but give him suggestions, we find that a large portion of the brain remains sensitive, that induced mental states or cortical processes—for some authorities contend that cortical processes in the hypnotized patient are not accompanied by any kind of consciousness—work out results which cannot be obtained in the patient while in the normal state. Hence hypnosis is in a sense a normal state artificially prolonged. It would, perhaps, be too much to say, with Mr. William James of Harvard, that we all pass through the hypnotic state every night while going to sleep. It seems to me probable that the methods which we use to produce hypnosis have a specific effect in determining the order in which the cortical activities are to sink into sleep, so to speak, which is not found in normal sleep. Yet the changes which take place in hypnosis probably do not essentially differ from those of normal sleep.

The phenomena of the hysterical condition, of epilepsy, of sundry forms of insanity, and of the rare trouble known as double consciousness, present many points of similarity with hypnosis, and we shall probably not be far wrong in classing all together as being due to derangement of cortical co-ordination. Sometimes, as, for example, in some forms of epilepsy, we have reason to believe that this disturbance is itself due to gross local lesions of the cortex. In many of these mental troubles we find derangement in self-consciousness and loss of voluntary control over different sensory or motor areas, and this is not seldom connected with heightened suggestibility. These facts have led many good authorities, notably Professor Charcot and the school of Paris, to regard hypnosis as a neurosis of the hysterical order depending upon some cerebral abnormality. I can, therefore, scarcely conclude this paper without making mention of this view and briefly indicating the reasons which lead me to dissent from it, although I do so with the modesty of the layman.

The researches of the school of Nancy have conclusively shown that the hypnotic state can be induced in the immense majority of normal adults, and they have been unable to discover any relation between susceptibility to hypnosis and hysteria, neurasthenia, or any other recognized disease. If, then, hypnosis is a disease, we are nearly all more or less tainted with it. This conclusion is supported by Moll, Dessoir, Wetterstrand, Forel, and many others. In the second place, I think that it is a misuse of language to term a state which can be experimentally induced and ended, but which does not spontaneously occur, and which, when thus experimentally produced and ended, does not tend to unfit the patient for the duties of life, a disease. But if ever we find hypnosis occurring spontaneously, it would tend to interfere with the patient's discharging his duties as a member of society, and in that case we would be justified in regarding it as a true neurosis of the hysterical order.

I have said that hypnosis may be regarded as an artificial prolongation of an approximately normal state. But, you may ask, what is the effect upon the patient of this artificial prolongation of a normal state? If the hypnotic state involves, as I am inclined to suppose, a temporary dissociation of cortical processes normally co-ordinated, even though this dissociation be produced by normal agencies, may it not be that by fixing and prolonging it beyond the normal time we may loosen the bonds of union between the different areas of the cortex and produce a true hysterical neurosis? The question is most pertinent, and can be answered only by reference to observed facts. Some few cases of mental disturbance have been reported from the use of hypnosis, but such cases have been so few in number that we are justified in saying that the danger of such results in the case of the healthy patient in the hands of a trained operator is practically negligible. Some slight physical discomfort, as headache, drowsiness, and lassitude, are frequently found, but can usually be removed by suggestion. Headache is a very common symptom. But the only danger which is both serious and common appears to be the production of increased susceptibility to the hypnotic state. This is a very real danger, and we must ever be on the watch against it and cease experimenting at the first suggestion of it. Most authorities believe that we can always guard against it by suggestion. We can to some degree, but I know of no facts that show that the suggestion will last as long as the increased susceptibility to hypnosis.

Apart from the physical dangers springing from the use of hypnosis, we must consider the moral. That moral dangers exist there can be no question. Already several cases have been reported in which criminal assault has been committed by the aid of hypnosis, and the French experimenters have enticed patients to commit imaginary murders and thefts, to sign promissory notes, and to bear false witness in the same way. Yet I do not feel that our present knowledge justifies much apprehension on this score. We hear much in the literature of hypnotism of the cases in which the suggestions succeed, but little of those in which they fail. And they very often fail, as I shall hope to show you. A suggestion whose execution the patient would find repugnant in the waking state will often meet with great resistance and sometimes fail of execution. The influence of the operator over his patient is much greater than in waking life, but it is perhaps never absolutely complete, and if there are persons who could be induced by hypnotic suggestion to commit crimes from which they would shrink while awake, such persons are probably exceedingly rare and their weakness is rarely suspected. One other danger remains which I must not fail to mention, and that is the danger springing from careless suggestions. I know a gentleman who thoughtlessly told his patient that the devil was after him, and had great ado to save the terrified patient from throwing himself from a sixth story window. The operator must ever remember that his every word is caught by the patient, no matter how impassive the latter may seem, and he must always be on his guard against saying anything of an exciting or terrifying character.

I have never seen any good reason for believing that there is any relation between hypnosis and telepathy. It is true that telepathic phenomena are from time to time reported as having been observed in hypnosis, but such phenomena are also reported in waking life. Most certainly the hypnotized patient is not, as a rule, sensitive to telepathic influences. But even if we admit that he sometimes is, it would not essentially modify the theory which I have outlined, and we would not be compelled to return to the theory of a force emanating from the operator and controlling the subject. We would merely be compelled to admit the possibility of a suggestion being conveyed in some way and by some means not at present understood.

In conclusion, let me say a word or two on the practical principles that should guide us in the use of hypnosis. No one should attempt it without having thoroughly studied the question, acquainted himself with the works of the great authorities, and having had some experience with an instructor. Its use should be limited to purposes of research, instruction, and therapeutics. A witness should always be present. The operator must rigidly respect the personal rights of the patient. He must have his full and intelligent consent to the experiment proposed, and must never endeavor to obtain influence over him at times or in ways other than those agreed upon. He must guard the patient effectually from any future inconvenience arising from increased susceptibility, and if he have reason to doubt his ability so to guard him, he must stop his experiments. And in the last place, and this principle includes all the others, he must ever have in mind and at heart the true welfare of his patient, and act in accordance with it.

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TO EVCAUATE AN ALVEOLAR ABSCESS—Plug the hole of a rubber-polishing cup with gutta-percha. Wet the inside of the cup, and place it on the gum over the opened abscess; gently press the cup flat on the gum,and then remove the finger. The elasticity of the cup will cause sufficient suction to fill it with abscess contents, and even draw through the sinus any medicaments placed in the tooth.—*Thos. M. Hunter.*

# SOME HEART REMEDIES COMPARED.

BY EDWARD CRANCH, M. D., ERIE, PA.

(Read before the Homœopathic Medical Society State of Pennsylvania, September, 1891.)

While it is true that nearly all drugs affect the heart, a few verified symptoms that seem to be characteristic may not be out of place, even if not strictly original.

*Digitalis* records the following: A violent but not rapid action; intensely aggravated by even the least muscular exertion, especially on rising. It is believed that whatever complication exist, unless the history reveals these features in prominence, digitalis is not the remedy. Further, digitalis has little, if any, pain, differing from *cactus*, which has much and continuous pain along with its boxed-up, grasped sensation and nervous accompaniments, and from *spigelia*, whose pains are quick-and darting, with great and visible palpitation. *Spongia* and *lachesis* have both an aggravation in sleep, by which the patient is roused, and both have suffocative action, but the spongia suffocation is from inability to have free use of the glottis, while the lungs are strong, and lachesis cannot move the ribs to allow the lungs to expand and cyanosis is more prominent. In spongia the air tickles the inside with distress and cough; in lachesis it is *outside* contact that is so unbearable. The cyanosis of lachesis will serve to distinguish it from the yellow hue of *crotalus*; otherwise these two are alike.

*Aurum* and *sepia* both let the heart thump with a sudden slap against the ribs, but aurum has it less frequently; sepia continuously, and with less hypertrophy. *Arsenic* and *secale* are both intolerant of lying down, but arsenic loves warmth, while secale shuns it to extremes. *Aconite* feels as if hot water were poured into the chest. *Sanguinaria* as if the same were emptied from chest into abdomen. *Gelsemium* is most valuable in weak heart, yet desiring motion; *nux vomica* in convalescence; worse from impatience and crowding thoughts; to be compared with *coffea*, if the thoughts be pleasant yet exciting.

*Phosphorus* for a heart whose subject yields to every sudden emotion the homage of a nervous palpitation, with fulness of veins and great redness of lips and finger nails; *veratrum viride* compares well, but there is more dyspnœa; *sulphur* also, but the palpitation is more continuous. *Glonoinum* shares with cimicifuga, arsenicum and kali bromatum valuable honors in "tobacco heart." Glonoinum has the greater throbbing, cimicifuga the greater anxiety, arsenicum the most dyspnœa and kali bromatum the most reflex action with craving for work.

Dr. Snader has shown that a greater or less amount of heart failure underlies every disease, and he has given us a most valuable aid in his wonderfully well-arranged repertory of the heart symptoms in Hering's *Condensed Materia Medica.*

## VAGINAL HYSTERECTOMY.

BY C. E. GROVE, M. D., SPOKANE, WASHINGTON.

Vaginal hysterectomy was successfully performed as early as 1815, by Langenbeck, but, on account of the fearful mortality, it attracted very little favorable attention until Pean, of Paris, took it up and developed it with some success. But even as late as 1877, the mortality had not been reduced below 82 per cent. From that time to 1884, the mortality dropped to 32 per cent. And during the next three years (1884 to 1887) it was reduced to 24 per cent. The improvement has continued, and within the last two years the operation has been so modified and perfected that at the present time the mortality in favorable cases is practically *nil.*

Vaginal hysterectomy may be performed in one of three ways—by the clamp method, the ligature, or enucleation.

Enucleation, originated by Langenbeck and revived by Pratt, is the best. By the clamp method, unnecessary shock is produced, and too much tissue is bruised, resulting in cicatricial tissue with its mischievous effects. By the ligature, sensitive nerve filaments are pinched, and disturbances of various functions of the body are caused. While enucleation, as modified and practiced by Dr. Pratt is the ideal method.

Mrs. M——, æt. 30, married, one child 4 years old; had fairly good health up to May 25, 1894, when she presented symptoms of miscarriage. She had missed one menstrual period, and thought she was pregnant. An examination showed and intramural fibroid of the cervix, and a mass at the internal os which gave to the examining finger the impression of a six weeks' fœtus. Patient was flowing considerably. The indicated remedies controlled the flow satisfactorily for a time, but would not cause the uterus to empty itself. Caulophyllum and ergot in material doses failed to have any effect. In the meantime, a mass of clot inclosing a blighted ovum came away, but left the above-mentioned mass at the internal os. This proved to be a uterine polypus, and afterwards disappeared. The patient continued from this time to the operation to fail in health and strength, flowing a great deal at times, and becoming pale, anæmic, weak and cachectic.

On October 13, 1894, a vaginal hysterectomy was performed, with the aid of Drs. Olmsted and Andrews. The method of operation was that used by Dr. Pratt, as follows:

The patient, having been previously ordered to eat no breakfast, take a warm bath, copious rectal and vaginal injections of warm water; the vulva, abdomen, and thighs were scrubbed with warm water and soap, the pubes shaved; the parts, including the vaginia, then washed with bichloride solution, next, with peroxide of hydrogen, then with bovinine, and then with sterilized water. The patient was anaesthetized by the Hayes Process. A vaginal retractor and Sims speculum was introduced, the cervix grasped with the volsella and drawn down, guy ropes of braided silk introduced into the anterior and posterior lips of the cervix and the volsella removed. The os was then thoroughly dilated with graded sounds, curetted, and packed with sterilized candlewicking ; this was to prevent getting any of the discharges into the wound later in the operation. The packing was left in to absorb the discharges and round out the uterus, thus making the dissection easier. The vagina was then amputated by making a circular incision through the mucous membrane of the cervix, just above the guy ropes, with curved scissors. The hysterectomy knife was then used to continue this incision through the connective tissue down to the firmer tissue of the cervix. The finger then easily separated the mucous membrane and connective tissue from the cervical and uterine tissue, with occasional aid from the hysterectomy knife and scissors, until the fundus uteri was reached, when the peritoneal cavity was entered, both in front of and behind the uterus. The uterus was then drawn further down, and the broad ligaments carefully severed close to the body of the uterus. A T-forcep was attached to the upper margin of each broad ligament before they were completely severed, so as to be easily found. The uterus was then removed, and the ovaries and tubes examined. Both ovaries and tubes were diseased, and were carefully dissected out with finger and scissors, keeping very close to the organs.

The first hæmorrhage encountered was from the first cut made by the scissors in amputating the vagina, but was very quickly controlled by a twist of the artery forceps. In severing the broad ligaments, sufficient hæmorrhage resulted to make it necessary to tie an artery on each side. After removing the right ovary, another small artery had to be tied. The whole amount of blood lost during the operation was small.

After removing ovaries and tubes, the broad ligaments were repaired by bringing together the cut edges of peritonæum with fine catgut. The peritoneal cavity was then closed by gathering up the edges of peritonæum with catgut, starting with the right broad ligament, and running around in front (just back of the bladder) to the left broad ligament, then around in the back (just in front of the rectum) to the right broad ligament again, and drawing them together with the catgut as a drawing-string. A plug made of sterilized India silk and prepared with hydrastis and quinine, containing a small ball of absorbent cotton, was placed against this vault and then packed with iodoform gauze; the wound in the vagina being thus held apart to insure free drainage. The vagina was then loosely packed with iodoform gauze. A number of pockets and papillæ were removed from the rectum, the sphincters stretched, and a plug of iodoform gauze placed in the rectum. Absorbent cotton was placed over the vulva and anus, a T-bandage applied, and the patient put to bed. The packing was removed after forty-eight hours, and the vagina repacked daily with iodoform gauze until the end of the first week. The packing was then discontinued, and a boracic-acid douche given daily.

A microscopic examination of the diseased organs was not made, but macroscopically the body of the uterus appeared to be sarcomatous. There was no circumscribed tumor at this point, but almost the whole uterine wall was infiltrated with diseased connective and fibrous tissue, making the anterior and posterior walls nearly ¾ inch thick. It was placed in a basin of water, and in half an hour had become black and slimy-looking. The ovaries were undergoing cystic degeneration. The left ovary had three small cystic tumors attached to it.

The patient made an uneventful recovery. The highest temperature was 100.1° on the fourth day, just before the bowels moved for the first time. The highest pulse was 104, three hours after the operation. The patient was catheterized for the first three days, after which she urinated naturally. Her bowels were confined until the fourth day, when she was given a warm water enema, after which they moved regularly. At no time after the operation did she suffer any pain in the pelvic region. Her only unpleasant symptom was nausea following the anæsthetic. This was relieved by natrum phos. and mag. phos., after which she received ars. alb. 6x for a few days. She was able to sit up on the fourteenth day, having already regained much of her accustomed vivacity and elasticity, and healthy color, which she had lost during the past five months.

In any operation, the details are very important, and especially in a capital operation nothing is too trivial to merit the operator's serious attention. I have, therefore, described this operation very minutely in the hope that it may help some surgeon who is about to undertake his first vaginal hysterectomy.—*Hahnemannian Monthly.*

## PENTAL.

DR. E. D. EDDY, SAN FRANCISCO, CAL.

Read before the Mid-Winter Fair Dental Congress.

Pure tertiary amylene has been named by Dr. Von Mering "Pental." The drug was formerly known as tri-methethylen, and later as isoamylene, but under these names it was still in a crude and impure condition; though first prepared by Calhours in the year 1843 or 1844, it was not till 1891 that a chemically pure product was made possible by a formula prepared by the eminent German scientist, Prof. J. Von Mering.

The original preparation was prepared by the direct action of sulphuric acid on amyl alcohol. By this method there was a small residue of the fusil oil that could not be eliminated; hence it never reached beyond the experimental stage as an anæsthetic, and was the cause of many fatalities during the years from 1844 to 1858. After the latter date we find no mention of the drug in scientific journals as an anæsthetic, up to the time Prof. Von Mering succeeded in making a chemically pure article by reducing the amyl alcohol to a hydrate and then heating with a compound acid.

Pental is now exclusively prepared at the great alcohol laboratories of C. A. F. Kahlbaum, Berlin, Germany. The symbols of the elements involved are represented by $C_5H_{10}$. It is a perfectly limpid liquid exceedingly volatile and very inflammable. It burns with an illuminating flame, and leaves no residue when burned from platinum foil. It has a low specific gravity with a constant boiling point of 102 F.; is insoluble in water, and does not decompose when exposed to the air. When inhaled it does not inflame or in any manner irritate the mucous surfaces with which it comes in contact; hence nausea and other distressing after-effects are avoided.

In a reasonably healthy subject the heart or respiration is not in the least disturbed. The time required to anæsthetize a subject rarely exceeds two minutes, and often thirty seconds are sufficient. The return to consciousness is immediate and complete.

Dr. Von Mering is a very able chemist and an expert pathologist. When he said in 1891: "I am convinced that pental, chemically pure, is by far the safest and best anæsthetic for short operations of which we have any knowledge," I know that his words meant something, for he is very conservative. That there is an element of danger to life in all anæsthetics, I fully believe, and they should never be administered carelessly, however safe they appear to be. The moment the danger signals appear, the dentist should be on the alert; and the fact that they do appear, should make us always careful. That pental is less likely to produce these danger signals than any substance heretofore used is certain. I have had sufficient experience with pental, gas, chloroform and ether to have reached this conclusion by comparison.

The chief advantages of pental are: 1st. Certainty of a painless operation. 2d. Speed. 3d. The immediate and complete recovery of the patient. 4th. Simplicity.

Pental can be applied in all respects the same as you give chloroform. As a means of economy, Junkers' inhaler is the best apparatus for its administration.

COCAINE MAY BE TESTED FOR THUS.—Add to the solution to be examined a drop of a solution of potassium bichromate. If cocaine is present a precipitate will form which vanishes rapidly, and on warming, the liquid turns green and gives off fumes having a peculiar odor—that of benzoic acid.

—*The Literary Digest.*

# ORTHODONTIA.

BY DR. HERBERT C. MILLER, PORTLAND, OR.

[Read before the Oregon State Dental Society.]

Irregularities and deformities of the teeth and jaws, their causes and correction, is a field so vast, so far-reaching in its proportions, that it is impossible to do justice to it in a single paper.

Orthodontia increases in interest as we accomplish results. It demands more of our earnest attention than has been given it in the past; and I predict the near future will record some of the most gigantic advances ever made in this branch of our profession.

The days of bunglesome, filthy, tortuous rubber plates, with uncertain, unreliable elastics, springs and wedges, are largely a thing of the past. We are refusing to adopt the methods practiced by our fathers and grandfathers; things that were good enough for our predecessors are not good enough for us to-day. A better light has appeared and we are witnessing the dawn of a brighter day. We are adopting methods, principles and devices that are better suited to our use, and the results are inspiring.

So many appliances and so-called methods have been invented I can hardly hope to offer anything entirely new. If by appropriating that which seems to be the best from the various methods and appliances, and presenting for your consideration its practical application to subjects which have come under my care, I can assist in inspiring hope and confidence where despair has reigned, and arousing new interest, the mission of this paper will have been accomplished.

To develop symmetry and beauty where distortion and ugliness prevailed; to bring order out of chaos, and to develop æsthetic contours of the face, which is accomplished by proper application of force to the teeth and underlying, bony structures is no mean ambition.

To the person able to cope with the mechanical obstacles this class of practice is extremely fascinating. When contemplating a case of irregularity we should bear in mind that the crowns of the permanent teeth in the jaws of a child six years of age are as large as they ever will be, with the exception of the third molars, the dentinal caps of which do not appear until about the twelfth year, and the roots are still to be formed. The jaws will continue to enlarge and expand until mature growth, which varies from eighteen to thirty-two years of age.

The central incisors lie anterior to the laterals, and the canines, which develop much later, are almost beside the central incisors, but higher up in the alveolus and external to the lateral incisors and bicuspids. As the roots of teeth develop their crowns are pushed to the surface, and at this time slight obstruction may change their course from the normal and result in an irregularity.

The canines erupt at from eleven to fourteen years of age, the lower ones generally in advance of the upper. When their roots are fully grown they are longest and firmest in their position of any teeth in the mouth. If the teeth on either side of them are extracted, the remaining teeth back of them (or incisors, if in front,) move or tip over toward the canines, while they remain nearly stationery throughout life unless powerful force is used upon them.

The teeth in the lower jaw develop first, and ought to guide the upper teeth into their right position. The lower molars and bicuspids incline toward the tongue. The upper molars and bicuspids are guided into their course by contact with the cusps of their antagonists, the outer cusps of the upper setting outside of the row of cusps of the lower.

Guildford, in his book, sets forth some of the principles to be guided by in correcting irregularities, which contain so much truth that I feel justified in quoting them :

1st.—The greatest good can be obtained from any force only when it is exerted in a direct line with the movement desired.

2d.—The force used must be sufficient, but not excessive ; and not to be abruptly applied.

3d.—The points of resistance and delivery of the force must be fixed points.

4th.—The resistance at the point from which we exert pressure must be greater than the resistance to be overcome by the pressure.

5th.—It should always be seen to in advance that there is sufficient space to accommodate the tooth in the new position it is to occupy.

6th.—Pressure may be either constant or interrupted.

7th.—Pressure should be exerted as nearly as possible in a line at right angles to the long axis of the tooth.

8th.—Always avoid, if possible, extracting any of the six anterior teeth in the superior arch.

9th.—In the lower jaw one of the incisors may sometimes be extracted to gain space.

10th.—Back of the anterior teeth, if all are equally good and one must be removed, select the one nearest and posterior to the one out of position.

11th.—If a tooth other than the one nearest to that in malposition be defective, and not too far distant from point of irregularity, extract it instead.

12th.—If a tooth must be lost, either to allow a more important one to fall into line or to create space, it should be done without delay to accomplish the best results.

13th.—If a tooth must be removed on one side to obtain space, it does not necessarily follow that its mate on the opposite side should also be extracted.

14th.—Where there is disparity in size between the two jaws, and two teeth need to be extracted from the more prominent one, it would be a serious mistake to extract also the corresponding teeth in the other and smaller jaw.

15th—Needless extraction should be carefully guarded against.

16th.—If a crowded arch calls for, or will admit of, expansion to advantage, do this in preference to extracting.

These rules should be carefully studied and understood by all who attempt regulating teeth. Impressions of both jaws should be taken and two sets of models made, one for use in constructing the appliance, and the other for preservation and reference.

Most cases require careful study, and plaster models will greatly facilitate determining the best course to pursue. Points not seen at first will be discovered by careful study. If possible, the patient should be made to appreciate the importance of the work, and his hearty co-operation enlisted.

Then the question of the patient's physical condition is to be considered, and may cut a large figure in deciding the course to be adopted. The age at which a great deal of the regulating is done occurs, unfortunately, when the patient is under great mental and physical tension. We should, therefore, observe caution in applying extra strains by our regulating appliances.

In probably enough exceptions to prove the rule extraction may seem necessary, and should only be resorted to in extreme cases and after careful deliberation. Any treatment which proposes to sacrifice masticasion for an effect pleasing to the eye is based upon a wrong understanding of the functions of the masticatory organs.

Under no consideration should we consent to part with any of the sixth-year molars until after mature growth, otherwise destruction of almost the entire grinding surfaces of the remaining teeth for mastication upon the side where the molar was removed may result.

The external contours should be closely studied, and correction of facial deformities be one of the principal aims. No appliance should be used that is uncertain in its action, or the result may be disappointment and disaster. The contrivance used should occupy as little space in the mouth as the service it has to perform will admit.

I prefer to use appliances that cannot be wholly removed by the patient, the action of which is positive and under my control. When I was at college we were taught that it was impossible to move the ends of the roots. This idea was incorrect; modern science has proven it to be erroneous.

Dr. Farrar says: "The secret of effecting a lateral movement of the roots of the teeth lies in relatively fixing the antagonizing ends of the crowns while the force is being applied at their necks."

This principle can be applied to the inner and outer movements of the roots as well as the lateral, or the principle may be reversed by fixing the necks of the teeth while force is being applied to the antagonizing ends of their crowns.

My first successful attempt at moving roots was in 1888; subject, young woman, nineteen years of age; central incisor widely separated. A narrow metal band was made on the principle of a loop matrix and placed around the central incisor teeth at their necks. By tightening this band the teeth were made to slowly approach each other at their cutting edges until the band was in danger of slipping off. A wedge was then placed between the crowns as close to their cutting edges as possible to prevent their coming closer together; and the band again tightened when the roots began to approach each other. To force the roots and adjoining bone of the anterior teeth forward, Dr. Case, of Chicago, constructs an apparatus after this fashion: Wide bands of German silver, from five- to seven-thousandths of an inch in thickness, are fitted to the crowns of the anterior teeth near their gum-margin, and perhaps extending a little beneath on the proximal sides; perpendicular bars, bent to fit the outer surfaces of the crowns, and extending from their cutting edges to about one-eighth of an inch above the gum-margin, are soldered to the bands. The upper ends of these bars should stand out free from the gum and be slightly thinned or flattened so as to be more easily bent around a rigid bar, which encircles the front and passes back through anchorage tubes attached to the posterior teeth. This bar, which should be very rigid, is drawn without annealing from No. 12 German silver wire to No. 18 E. S. C. The ends are threaded in the No. 4 hole of a Martin screw plate. Nuts should be screwed on to work at the anterior ends of the tubes, and these placed in the unclasped ends of the upright bars, which have been kept open to receive them. Another much smaller bar rests in depressions in the upright pieces near the cutting ends of the teeth. The ends are threaded and passed through tubes soldered to the anchorage bands on each side below the power bar-tubes, with nuts applied to work posteriorally to the tubes. To reduce a prominence by forcing back the roots and alveolus of the anterior teeth, a similar appliance is made, excepting that the bands should be fitted to the incisors near their occluding ends, instead of their necks, so as to furnish a more rigid bearing in the changed application of force. The lower ends of the perpendicular pieces should clasp the fulcrum bar, and the nuts should be reversed in their relative position to the teeth.[*]

I do not believe that the bones and alveolus of youth remain stationary, and are absorbed away in front, and built in behind the moving teeth, but are amenable to pressure. While absorption and building-in does take place, the greater portion of tissue in which the teeth are imbedded moves with them, unless prevented from doing so. Gentle pressure and slow movement would favor movement of the root through the tissues by absorption in front and filling in behind; while more force would be required to change the form and contour of the parts.

## WATER DRINKING.

### DR. W. C. BARRETT, ED. IN PRACTITIONER.

One frequently comes across articles in medical and other journals warning people to be abstemious in water drinking. One directs that water should only be taken before meals, another insists that it must be drunk only afterward, while some declare that it should not be taken at all, if it be possible to avoid it. To the man who thinks for himself, all this is the veriest nonsense. Water is the universal solvent of the human system. All the effete matter must be eliminated by its aid, and the greater the waste the more the necessity for taking plenty of it. If there be unusual exertion of any kind, there will, of course, be an excessive amount of urea in the body, and this should be held in solution by water.

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[*] See Dr. Case's article on Facial Contorus in the Practice of Orthodontia. Vol. I., page 210, *Pacific Coast Dentist*.

Let any man whose functional activity is great, watch the effect of abstaining from fluids. Quite probably he will find his urine becoming turbid, with dark deposits, and there will be a tendency to their retention in the tissues. This means rheumatism, gout, calculi, and other evils resulting from a lithemic condition. Let such a one then drink plenty of pure water and the morbid symptoms will disappear, unless they be due to inactivity of the kidneys.

The skin has important emunctory functions, but if the tissues be poorly supplied with the necessary amount of water, the perspiratory glands become inactive, and there is a lack of their depurative influence. Fevers may frequently be aborted or broken by the free use of pure water. The temperature of the body is kept at its normal point by the evaporation of water from the surface of the skin. All the secretions of the body are dependent on water for their integrity. No amount of solid matter can compensate for a lack of fluids.

If any one is undergoing great exertion, let him partake freely of fluids and he will find that he will be less exhausted at the end of it. When we have found it necessary to labor unusually hard, have made it a point to drink water freely and frequently, not waiting for extreme thirst, but taking a glass of it whenever we felt that it could be drunk without discomfort. We feel assured that if many of our hard working dentists would make a point of drinking more water, they would avoid that feeling of complete exhaustion, for the waste products of their exertion would be more speedily and completely eliminated.

Subscribe for THE DENTAL AND SURGICAL MICROCOSM.

# METHOD OF INDUCING LOCAL ANÆSTHESIA BY COCAINE.

BY D. CARACATSANIS, M.D., ATHENS, GREECE.

[Read before the World's Columbian Dental Congress, Chicago, August, 1893.]

You are all acquainted with the danger of cocaine injections for the painless extraction of teeth. Its narcotic effects are surprising, but unhappily they are frequently followed by untoward consequences; even loss of life has occasionally resulted. At the Dental Congress in Paris animated discussions arose on this subject. Since then I undertook some experiments to determine whether some procedure might not be substituted for injection—some milder method for the induction of local anæsthesia by means of cocaine.

I proceeded on the basis that if its effects could be completely localized, cocaine would answer perfectly. Such a method I have found; I have applied it practically for several years. The patients have nothing to complain of, not even the slightest indisposition. Accordingly it is with the greatest confidence in my method that I lay it before you. The operation is simple, within the power of every one ; its only imperfection is that its application demands considerable time; sometimes as much as three-quarters of an hour is required for complete anæsthesia. The procedure is as follows: I begin painting the gum, next the tooth to be extracted, with a steel instrument wrapped in cotton dipped in a solution of phenic acid, 2 to 1000, which I have heated. This is followed by the application of the salt of cocaine by means of a pledget of cotton impregnated therewith. As soon as the gum shows signs of insensibility, I commence to separate it slowly from the tooth by means of a bistoury. I insert into the space thus effected pledgets of cotton impregnated with cocaine as before. As the anæsthesia advances, I enlarge the opening to a depth of about one centimetre, on the buccal as well as on the lingual surface. I direct the patient to abstain from swallowing the saliva, to avoid all absorption of cocaine. I take good care not to forget the cotton pledgets placed between the gum and the tooth.

After assuring myself by strongly making pressure on the parts with a steel instrument, I have my assistant to spray the parts with a mixture composed as follows:

Chloroform, 25 grammes;
Sulphuric ether, 40 grammes;
Menthol, 3 grammes;
Cocaine, 1 gramme;
Essence of mint, 1 gramme.

I extract while the parts are being sprayed. The resulting anæsthesia is absolutely complete; the only condition in which I have failed to produce it being the existence of inflammation or periostitis.

To convince you thoroughly, I am prepared to make the experiment with my method before your honorable Congress.

*Pacific Coast Dentist.*

## CURRENCY REFORM.

The President's message, the annual report of the Secretary of the Treasury, and the report of the Controller of the Currency all give much prominence to the question of currency reform, and Congress has taken the matter in hand with an interest and a degree of intelligent comprehension that had hardly been anticipated. Recent experience has taught the country several important lessons. It has shown that the volume of outstanding treasury notes puts a wholly unnecessary and exceedingly difficult and costly burden upon the public treasury, through the necessity of maintaining large reserves of gold in order to redeem notes which are never canceled and which may therefore be used again and again to deplete the stock of accumulated gold. Again, it has been made clear to the whole business world that our banking system does not afford any such elasticity of currency as the strenuous demands of business sometimes make desirable. In fact, the recent money panic was due in large part to our system of banking, which refuses to give credit and lend money precisely at those times when banks should come forward and sustain the commercial and industrial world. What is now proposed is some plan of bank note issues which may be made, in the first place, to assist in retiring or locking up a large part, if not all, of the outstanding volume of greenbacks and treasury notes; and which, in the second place, shall have such an element of elasticity as to make the circulating medium expand and contract as the state of business may dictate. Our Canadian neighbors have a flexible and successful system of bank note issues, and the plans now under discussion at Washington, resemble in many respects the Canadian currency and bank system. Our monetary circulation has become complicated and diverse, and it needs simplification. Secretary Carlisle's proposals, while in some respects perhaps far from ideal, or theoretical perfection, at least point the way toward a currency system that would be a great improvement over the existing one. Upon one thing at least, let us congratulate ourselves. It is not necessary for us in practical business to note any distinctions in the form of our currency. For purposes of ordinary exchange, it does not make the slightest difference whether one receives payment in gold, silver, greenbacks, bullion certificates or national banknotes, because the national credit is behind all these varieties of circulating medium, and none of them will be permitted to come to grief. Nothing in Mr. Cleveland's message has a firmer tone or a clearer ring than his declaration that the administration will not hesitate to issue bonds and buy gold whenever it seems necessary in order to preserve the national credit and the parity of our different forms of money. A good monetary system bears a vital relationship to the industrial life and prosperity. It is evident that our present system can be materially improved; but as for those who complain of it too bitterly, we should suggest that residence for a year or two in a country whose currency is really vicious and debased would give them a totally different view of conditions in their own country. We want a dollar that shall be safe, stable and relatively equable as a measure of value, but we want no crude experiments.

# THE ISSUE OF TREASURY BONDS.

Commenting in his *Social Economist* upon the proposal, since carried into effect, to sell fifty more millions of government bonds, Mr. George Gunton points out that this means of replenishing the Treasury is uncovering a weakness in our financial condition greater than had been suspected: "The government appears to be discovering for the first time the evils, indeed the imminent national bankruptcy, which threaten it so long as the United States Treasury is the sole debtor, in a nation of sixty-two millions of people, that can be asked for gold on its demand obligations. All the banks can make the government their 'buffer' under the Legal Tender act by paying in greenbacks. All the depositors can, under the Legal Tender act, call upon their banks for the greenbacks. Holding either greenbacks or 'Sherman notes' they can present them at the Treasury and demand gold for them. This same gold they can tender to the Treasury in payment of their subscriptions to the fifty-million loan put forth ostensibly to replenish the Treasury with gold. In short, the purchasers of the bonds can draw out at the Treasury 'spigot' the whole fifty millions of gold which they pour in at the Treasury 'bung,' get 2 8-10 per cent. per annum for loaning to the government exactly the $61,500,000 in gold now in the Treasury and not increase the stock of gold in the Treasury by a dollar.

"Never in all the history of national finance, not even in any of the old sinking-fund plans of paying off the principal of a large debt out of the savings to be made from interest derived from investing small portions of that same debt, nor in any of the famous financial hocus pocuses and bubbles of the South Sea and Mississippi era, was there ever devised a scheme so thin as that of keeping gold in the Federal Treasury by means of a sale of bonds when every purchaser of the bonds is entitled by law to draw gold from the Treasury itself to purchase the bonds with."—*Review of Reviews.*

Ed.—The greatest weakness manifest in the attempt to replenish the Treasury, is in the act and agreement to pay these bonds in gold currency instead of in government notes. If gold can be supplied to the Treasury of the United States by the issue of bonds to be sold for gold, and these bonds made payable in government notes and not in gold, it will be readily seen that we can very easily keep enough gold in the Treasury for all practical purposes and at a very small cost to the government. But under the present *regime* of replenishing, what Mr. George Gunton says of pouring in at the Treasury bung and taking out at the spigot and getting for the act 2 8-10 per cent. per annum, is certainly true and demonstrates beyond a doubt a very great weakness in our government policy.

## NITROUS OXIDE GAS KILLS.

A prominent merchant recently in New York, named Sears, a young lady named O'Shaughnessey, and James C. Creswell, a wealthy Philadelphian, died in a dentist's office after taking nitrous oxide gas.

As it is only an asphyxiating agent, and antagonizes life from the very first inspiration, it is not in accordance with the laws of nature and of the constitution of man to take this pernicious gas without injury, either direct or indirect, to the body or mind, or to both. A clergyman's wife in Clearfield County, Pa., and an interesting young lady from Butler, Pa., have been crazy for years from the use of this gas, to have teeth extracted. In point of truth, asphyxia is the first step in at death's door. And the simple fact that no one has ever yet breathed this nitrous oxide, or so-called Laughing Gas, exclusively and continuously three minutes without being a corpse is sufficient warning.—*Pittsburg Press.*

PITTSBURG, PA., December 25, 1894.

TO WHOM IT MAY CONCERN:—This is to certify that the Hayes Dental and Surgical Manufacturing Company are the sole agents for the sale of Hayes Hypnotic and Chlorolene, and that they are required to maintain the uniform price to the retail trade of $2.50 per pound.

Respectfully,
Hayes Anæsthetic Co.

# THE DENTAL AND SURGICAL MICROCOSM.

A QUARTERLY MAGAZINE.

EDITORS:
S. J. HAYES, D. D. S., M. S. A.     MRS. F. R. HAYES, A. M.

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## EDITORIAL REVIEW.

THAT which is most worthy of note in all the realm of human events, and especially in all the proceedings of dental and medical societies, is the surprisingly singular *attitude* of prominent members of the American Dental Association, as well as that of the Association itself, in the recent effort to popularize nitrous oxide gas by celebrating the deed and honoring the name of Dr. Horace Wells, a dentist of some note, who once lived in Hartford, Conn., and has the credit of having had the first tooth extracted while in a state of asphyxia induced by the administration of nitrous oxide gas. This attitude must unavoidably strike any one as being remarkably strange, who recognizes the difference between anæsthesia and asphyxia and what must necessarily constitute the respective agents to produce these radically different physical conditions, and who also recognizes the difference of the simple act of having a tooth pulled while in a state of asphyxia caused by the administration of any inert gas, and the act of discovering anæsthesia, a physical condition that can only be produced by a true anæsthetic which must necessarily always have in it sufficient *free* oxygen as the all-important chemical element to sustain life. Is it possible that these reputed men of science and of literature, who have necessarily admitted in their public addresses on the occasion of this recent celebration, that Dr. Wells did not discover nitrous oxide gas, and that he was not the first to discover that by its exclusive use a physical condition could be produced in which there is absence of sensation, as both Drs. Fillebrown and Garretson joined others in giving praise to Priestley for the discovery of the former, and to Sir Humphrey Davy for the discovery of the latter,—its use to produce a state of asphyxia in which a surgical operation was performed on his person,—could set up such a claim?

After having thus definitely specified that the late Dr. Wells did not discover either nitrous oxide gas, nor that it could produce a physical condition in which surgical operations could be performed, they set up the claim that he was the discoverer of anæsthesia. Did ever mortal man in all human events discover such a monstrosity in their researches in literature pertaining to science? What, in all candor, did Horace Wells discover? He did not discover that persons could have their bodies cut or bruised without feeling pain while asphyxiated or in a state of insensibility, as others had witnessed that repeatedly. Nor did he discover that a surgical operation could be performed while in this condition induced by nitrous oxide, as Sir Humphrey Davy demonstrated that on his own person and stated that it might be used in surgery. But he, by his own experience in having a tooth pulled, discovered that a tooth could be extracted while asphyxiated with this gas, and suggested its general use for that purpose.

Then, in the face of all these incontrovertible facts, and in the face of the *conceded fact* by both the dental and medical professions at large that nitrous oxide gas neither supports combustion nor sustains life, and that it can by its exclusive use only produce asphyxia, what can have actuated these men to appear before the public with a claim so preposterous and in language most eloquent, seek to commemorate an event claimed, which event can only be recognized as a sphynx or an *ignis fatuus?* We appeal to the intelligence of both the medical and dental professions as to whether this does not seem like the dying throes of a condemned and expiring cause.

Nitrous oxide gas having become unpopular in most sections of the country from the numerous cases of insanity and death due to asphyxia which it invariably produces, which fatal and injurious results the dental journals published by the dental dealers in nitrous oxide and gas apparatuses refuse to publish, its friends seem to have seized upon the fiftieth anniversary of this tooth pulling act to rally their forces and by this overt act bring indirectly this condemned criminal—nitrous oxide gas—into public favor again.

When such a man as the eminent Dr. Richardson says: "That nitrous oxide only produces asphyxia, and that asphyxia is the first stage of death," and that "its use should be prohibited by law," and when such men as Dr. L. Turnbull, Dr. Lyman, Dr. Chisholm, and Dr. Sansom pronounce it only an asphyxiating agent and condemn its use, it is high time that the honored men of the dental profession consign it to its deserved grave.

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In these closing century days, so fraught with the status of woman in the affairs of State, it is pleasing to learn of a truly womanly woman. That her influence and power in the events of life, before the public eye or in the retirement of home, are a vital factor, no person of intelligence can deny to woman. But that it is more commendable for her to be arrayed as a guide in state-craft, or that she be gazed and commented on by a promiscuous public, is open to question, and can but, at times, make one half wish more frequently to find a woman willing to be known by the influence of her good deeds, though the doer may never stand upon the oratorical rostrum.

In the recent death of the Princess Bismark, not only is society deprived of an interesting and talented woman, but one of the foremost statesmen in the world's history meets with the loss of his devoted wife, and the able co-adjutor of his long and varied career of State. To be the wife of a great man requires elements of character possible only in a great woman, and marriage certainly does not appear to have been a failure on the part of the leading statesman of Europe. Princess Bismark, like Mrs. Gladstone, has been unremitting in her devoted attention to her husband, in her sympathetic appreciation of his worth, and in her effective service to his public interests. She has been to Prince Bismark all that Mrs. Gladstone is still spared to be to England's influential servant, Mr. Gladstone. Great as these men are in the estimation of the outside world, and much as they have done to advance the welfare of their fatherland, it is doubtless true that, but for their wives, they might never have accomplished the important work they have done.

WE hereby acknowledge with thanks the receipt of the neat pamphlet containing the report of the proceedings of the 10th and 11th Annual Sessions of the National Association of Dental Examiners, held August 11, 1893, at Chicago, and August 7, 1894, at Old Point Comfort. In this we note with pleasure the firm purpose of this organization to raise the standard of qualifications of practitioners by keeping a vigilant eye upon the work and character of the Dental Schools. To our mind the work of this National Association and Dental Examining Boards is indispensable in securing a more thorough education and schools of a higher order. We note also from this report, with regret, the rapid increase of the Dental Colleges in the U. S. A. Twenty-eight of these colleges have been recognized as reputable and eight of them not yet recognized. One-fourth as many schools, properly equipped and manned with thoroughly competent instructors, would undoubtedly do better work and be a greater honor to the profession.

Subscribe for THE DENTAL AND SURGICAL MICROCOSM.

The publishers of the DENTAL AND SURGICAL MICROCOSM desire to call special attention to this journal. It contains 76 pages of solid reading matter of interest to all, but particularly so to members of the medical and dental professions. The articles on anæsthesia alone in this number, are worth many times more, to any physician or dentist, the subscription price. He who carefully peruses these, will indirectly receive more than the value of his money, as they are fast tending to revolutionize the science of anæsthesia. The journal has rapidly assumed an important position in medical and dental literature until it is now beyond question one of the foremost quarterlies in the world. It has hitherto been sent to many who are not regular subscribers, the postage being paid by the publishers; but its pages for advertizing being limited in number, of course, materially increases the cost of publication. Some of the present issue are being sent out free, and the publishers will continue to send specimen copies to such as ask for them, trusting that all who desire to read the journal regularly, will send in the subscription price at once. This is one dollar per year, and the MICROCOSM is veritably worth more than the price of it to any person. We can supply to new subscribers the January number of the present issue, Volume IV, but orders for back numbers cannot be filled, as the demand has been greater than was anticipated. Subscription blank is found on the first page of each issue and the publishers desire to ask you personally to continne your acquaintance with the DENTAL AND SURGICAL MICROCOSM by sending in your subscription immediately.

IN consequence of sickness and death in the Editor's family, the publishing of the MICROCOSM has unavoidably been somewhat delayed. Volume IV. opens with the present number for January, 1895. We shall study to make the Journal for the coming year superior to its past record, highly commended as that has been, by the profession and others. Several new features are being introduced, and no effort will be omitted which can make the MICROCOSM more beneficial and acceptable in its increasing patronage. With a hearty good will it extends a pleasant greeting to its subscribers, and to all cordially wishes a happy new year.

THE Editor of the *Dental Digest*, in his zeal to help and encourage dentists, certainly gives very indiscreet advice to his professional brethren. After saying that "a new era is beginning, the bad times (financially) are about over and the cheerful dentist must look forward," he says, "do not look down in the mouth." Where else shall the dentist look for work and money, pray tell us?

## SUDDEN DEATH.

Mrs. Kate Ledbeater, daughter of Peter McCue, who lives near Oakford, Ill., recently died in Dr. Solenberger's dental office, while under the influence of an anæsthetic, which, at her request, had been administered by Dr. Whitley, preparatory to having some teeth pulled. Coroner McAtee held an inquest, at which it appeared in evidence that the usual precautions had been taken, before and during the administration of the anæsthetic, which Dr. Whitley stated was hydrobromic ethyl, used for short operations. The jury's verdict was that she came to her death by paralysis of the heart, and exonerated all parties from blame.—*Items of Interest.*

ED.—What a sad comment upon the intelligence of both Doctor and jury. Died of *heart failure* or paralysis of the heart. Who ever heard of the death of any person or animal without paralysis of the heart? Then of course the Doctor who administered the so-called anæsthetic, must be exonorated from blame, inasmuch as the heart failed to perform its functions. What a bold, blind piece of effrontery thrust upon the intelligence of the community to cover up the misdeeds of professional men in whose hands are the lives of suffering humanity.

If an inquest was held, it certainly should have been to ascertain the cause of the death, and not to shield, simply from blame, the parties concerned. There was a cause for the heart failure. What was that cause? To ascertain this cause was the mission of that jury. Was that a true anæsthetic agent which was administered? If so, then the anæsthetic did not kill. A true anæsthetic has never yet, and never will, kill. But hydrobromic ethyl is not, *per se*, a true anæsthetic. But if the atmospheric air be properly charged with this naracotic as it is inhaled, this narcotized air will be a true anæsthetic, and true anæsthesia will be produced, and not death. If a *sudden* cessation of the functions of the heart occurred, it must have been caused either by the sudden action of the mind, or by an over percentage of the hydrobromic ethyl, and in no other way that can be conceived of. But as we have no knowledge of the condition of either, we are at a loss to know definitely which caused the death. Yet, as the lady desired to take the drug, it is quite probable that she was not frightened, and hence the latter more than likely caused the death.

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WILL Drs. Thomas Fillebrown, John D. Thomas or any of the nitrous oxide gas advocates, define anæsthesia and asphyxia, and tell in unmistakable language in what respects these physical conditions differ from each other, and in what respects they resemble each other? Will they also tell us what evidence they have of nitrous oxide being a narcotic?

If a physical condition in which there is absence of sensation is only necessary to constitute anæsthesia, is death or syncope a condition of anæsthesia? If so, should any agent, such as a club, electricity, etc., that may produce these results, be properly named an anæsthetic? Answers to the above are respectfully solicited for the April number of the DENTAL AND SURGICAL MICROCOSM.

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IN the recent rambles of the Editor of the DENTAL AND SURGICAL MICROCOSM among his fraternal co-laborers in New England, he was generally received most kindly, and cordially welcomed to their associations, and often to the hospitality of their homes. He now avails himself of this opportunity to return thanks, and to express the wish for a more extended and intimate acquaintance. The deep interest taken in the Art and Science of Anæsthesia, as presented by the Editor before the New Hampshire State Dental Association, the Boston Dental College, the Harvard Alumni, etc., was, to an eminent degree, gratifying, many expressing a sanguine hope for an entire revolution of this important science.

It may not be amiss to call attention to a misrepresentation going the rounds that the Hayes Process of Anæsthesia embraces essentially the use of secret preparations. There never was a more false representation. There is nothing secret about it and *never was*. By the Hayes Process and Apparatus any suitable narcotic may be used as the subordinate element in the anæsthetic. Besides, the chemical formulæ of both Hayes Hypnotic and Chlorolene are given to the professions and they stand on their own merits just as Squibb's chloroform, ether, or any other narcotic does. Is there anything in this that is not open and fair to the professions?

## GREETINGS.

In the dawning of the year 1895, we send greetings to the many Licensees of the "Hayes Process of, and Apparatus Generating and Applying Anæsthetics, etc." and are pleased to convey the intelligence, that notwithstanding the opposition exerted by the dealers in nitrous oxide gas, and gas apparatuses which has been thus far conducted on the "underground railroad system," not desiring an open conflict in the advancement of art and science on merit, the Hayes Process of Anæsthesia stands on its record peer to everything else for the purpose of producing anæsthesia. At our recent estimation of the number of patients anæsthetized by the Hayes Process with the use of Hayes Hypnotic and chlorolene, estimating seventy-five patients to the pound bottle, over 500,000 patients have been anæsthetized by dentists and physicians by the use of these two narcotics alone. Besides, some have used chloroform and some ether and some the A. C. E. mixture. Up to date there has not been a single death with the use of the Hayes Process of Anæsthesia. This record is *unparalleled* in the history of the use of anæsthetics, and should inspire the most profound confidence in its safety, effectiveness and crowning success.

Respectfully,
Hayes Dental & Surgical Mfg. Co.,
Chicago and Pittsburg.

## REVIEWS.

"Hypnotism, its Facts, Theories and Related Phenomena" is the title of an interesting work by Carl Sextus, a well-known practitioner in the occult science of Hypnotism or involuntary suggestion.

In an interesting manner he traces the progress of these mental hallucinations from their incipiency among different nations in past centuries, to their status at the present day. To this power on the part of the operator, he attributes the so-called magic influence by which animals of the lower orders are variously and mysteriously controlled, contrary to the usual law of their nature, and he ably argues against the popular belief that to hypnotize is a positive means of weakening character ; he also maintains, with good proof, that hypnotism does not change the moral status of its subjects. In conclusion he presents, in strong terms, the great good which may be accomplished in the realm of disease and suffering, by an intelligent use of this mysterious and subtle power.

All who are interested in the science of hypnotism, will find this work a unique production. It is published by the author, Carl Sextus, Chicago, Ill.

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To the busy worker, who has little time for a wide range in the field of general literature, the "*Review of Reviews*" is an open sesame to good things. The December number comes to our table, filled with comprehensive sketches of current events. It is unusually strong as a book number, with its 17-page resume of the American and English literature of the month, while in the political world it presents a detailed review of the various campaigns in the different States, pointing out the issues involved and indicating the influences at work in the several sections of the country.

The December number of *The Pacific Medical Journal* maintains its high standard of professional excellence. Its initial article, "Stump Oratory in Medicine," is an outspoken plea for more tolerance of worthily equipped practitioners of foreign birth.

WE are in receipt of the first number, Vol. I, of the *Dental Digest*, a new claimant for professional favor. Its appearance is prepossessing and its contents are well adapted to the needs of dentists, being full of suggestions of worth.

Its initial articles, Dental Practice on Business Principles, and A New Method in Regulating Teeth, are exceptionally fine and its editorial matter is pointed and timely.

THE MICROCOSM extends a cordial welcome to The Dental Digest.

Our thanks are due Dr. Gustave P. Wiksell of Boston, Mass., for a truly unique literary production, *Oahspie, A New Bible.* As its name indicates, it is classed among sacred letters, and is replete with practical principles of high moral worth.

In Anæsthesia there must be a continuous supply of *free* oxygen to supply the red corpuscles of the blood necessary to support combustion and sustain life. In Asphyxia there must be a suspension or deprivation of the *free* oxygen to deoxidize the blood and produce as a consequence unconsciousness and insensibility.

The new book promised on "THE ART AND SCIENCE OF ANÆTHESIA" that is being written by Dr. S. J. Hayes has been necessarily delayed by protracted sickness and death in his family. It will however appear during the present year, when all orders will be promptly filled.

# WANTS, FOR SALE, ETC.

Our terms for advertising under this head are 5 cents per line. Initials will be charged same as words. Advertisements must be in our hands fifteen days before the first day of the month of publication, to insure insertion in following number. Cash or postage stamps must accompany all advertisements.

Hayes Dental and Surgical M'f'g Co.,
901 Penn Ave., Pittsburg, Pa.

WANTED—Experienced all around Dentist, thoroughly competent. Address, Dr. Dunn, care Dental and Surgial Microcosm, 901 Penn Ave., Pittsburg, Pa.

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WANTED—An expert extractor of teeth. None other need apply. Address, Dental and Surgical Microcosm, 901 Penn Ave., Pittsburg, Pa.

WANTED—Expert extractor of teeth and first-class, experienced salesman to travel and sell Licenses for use of Hayes' Process of Anæsthesia, etc. Address, Hayes Dental and Surgical M'f'g Co , 901 Penn Ave., Pittsburg, Pa.

FOR SALE—In city of 300,000 population, a complete dental outfit, latest Wilkerson chairs, fountain spittoon, etc., and good practice. Cheap; part cash and on time. Address, Dentist, Hayes Dental and Surgical M'f'g Co., 901 Penn Ave., Pittsburg, Pa.

THE
DENTAL AND SURGICAL
MICROCOSM.

VOL. IV. APRIL, 1895. NO. 2

# ANÆSTHESIA vs. ASPHYXIA.

BY S. J. HAYES, D. D. S., M. S. A.

It is a matter of no small importance to the scientific world that the premises, or base upon which any science, is established, shall not be false nor misleading, not be as the foundation built upon the sand, but that it shall be built upon the eternal rocks of truth, imbedded in the unchangeable laws of God. Especially is this true of the Art and Science of Anæsthesia as relating to the Medical and Dental Professions. If human life, in the agonies of the suffering, is dependent upon a correct knowledge of the laws of nature and their strict observance, also, of the precise physical conditions to be maintained in harmony with these laws in our efforts to secure immunity from pain in surgical operations, then surely the *importance* of knowing and understanding definitely the condition which is necessary to be attained and maintained during those operations, and how it differs from others to which it bears a marked resemblance, but from which it radically differs as relating to the functions of the vital organs and life itself, the *importance*, we say, is momentous to those whose mission is to *relieve* suffering and save life. Therefore, let such not be mislead by so *called authority*, or previously conceived ideas, but each one for *himself* investigate in the line of the correct use of language and terms to be applied in designating and defining physical conditions, and let him know to a certainty what is necessary to constitute that condition in which there is no peril to life and which should be correctly named Anæsthesia.

Men have lived, and do still live, who have won distinguished honors in their display of knowledge of the use of language. Yet by the lack of definite knowledge of the subject, condition or thing to which the language is applied, they have misused and misrepresented, and therefore, lexicographers have found it quite necessary to frequently change the terms or definitions applied in order that a more accurate knowledge be attained. This is pre-eminently the case in the use of the word anæsthesia, as will be readily recognized in the history of its introduction.

Dr. Oliver Wendell Holmes, to whom all credit is given for the introduction of the word to designate the physical condition produced by the administration of etherized air as discovered by Dr. Wm. J. Morton, wrote to Dr. Morton in reference to an appropriate name for the condition, on November 21, 1846, as follows:

"My Dear Sir:—Everybody wants to have a hand in a great discovery. All I will do is to give you a hint or two as to names or the name to be applied to the state produced and the agent.

The state should, I think, be called anæsthesia. This signifies insensibility, more particularly (as used by Lanneus and Cullen) to objects of touch. (See Good-Nosology, p. 259.) The adjective will be anæsthetic.

Thus we might say the state of anæsthesia, or the anæsthetic state. The means employed would be properly called the anti-æsthetic agent. Perhaps it might be allowable to say anæsthetic agent, but this admits of question."

In this letter, it is clearly seen that while Dr. Holmes had a correct knowledge of the meaning of the word as applied to prehension of feeling, and had reference solely to a condition of absensation, while at the same time he evidently, overlooked the fact that the essential and all important feature of this physical condition is, that while absensation is induced and maintained, the force and functions of life must be in continuance. He seemed to be convinced that the condition was an anti-æsthetic state. Yet he failed to note that in the æsthetic state there must absolutely be a continuance of the *force* and functions of life.

Then Webster and other lexicographers, taking their cue from this man of renown in literature, adopted the definition for the word anæsthetic, "That which produces insensibility." In accordance with this definition, if we produce insensibility with a club or with electricity, the agent must be an anæsthetic and the condition produced must be anæsthesia. Then any physical condition in which there is absence of sensation, is a state of anæsthesia. Then asphyxia, paralysis and syncope are conditions of anæsthesia, and it is to be regretted that many physicians and dentists, being misled by this definition ordinarily given to the word anæsthesia, fail to recognize the true physical condition that must necessarily constitute the anæsthetic state, and consequently fail to discriminate in the selection of the proper agent to produce this much desired condition of safety for surgical operations.

Æsthesia is a condition of sensibility. But in order to realize sensation the force and functions of life must be continued. Anæsthesia is the opposite of or against Æsthesia, and is a condition of insensibility, and consequently, in this condition, there must also be in continuance the force and functions of life. Therefore the correct definition that "Anæsthesia is a physical condition in which the force and functions of life are in continuance under modifications whereby absensation is produced," must necessarily be borne in mind in determining not only this desirable condition, but in selecting the agent to produce this desired and safe condition for surgery. We have never yet found any scholar who would question the correctness and appropriateness of this definition. With this definition the word designates a physical condition radically differing from that of asphyxia, syncope or paralysis by shock produced by any agent. It refers to a condition of life in which there is absensation or only partial sensation. While asphyxia is a physical condition in which the force and functions of life are suspended or abrogated. The latter is a condition of partial death induced by the *deoxidation* of the blood. It is the first stage of death. It is generally admitted that the force of life is free oxygen, or that *free oxygen* is that out of which vital force is generated by the cerebral glands of the brain and the pneumogastric glands of the lungs. Therefore, when this *force* of life (free oxygen) is suspended or cut off, the blood becomes impoverished or deoxidized, and the functions of life and sensation are suspended, or partially suspended. The evidence of this deoxidation is black blood, which varies in its manifestation in purpleness under the eyes and over the alaqua-nase in persons of different temperaments and different complexions. Yet the blood is always black, varying in the degree of blackness in accordance with the extent of the asphyxia. In partial asphyxia, or in the first stage, there is usually only partial insensibility to pain, while in the second and third stages there is usually complete absence of pain in surgery. But the evils resulting in the use of any asphyxiating agent for the production of absensation, are of such grave consequence and fraught with such peril to the nervous system and to life itself, that no man who fully comprehends this condition with its dire results consequent, would venture to produce this first stage of death. Hence, it is a subject of paramount importance to the surgeon to know definitely what is necessary to constitute an asphyxiant, and of more than equal importance to know definitely what is absolutely necessary to constitute a true anæsthetic, without which no one should attempt to produce the anæsthetic state.

Therefore, to assist the reader to more fully comprehend and clearly diagnose these respective physical conditions we repeat and contrast definitions and conditions.

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| 1. Anæsthesia is a physical condition in which the force and functions of life are in continuance under modification, whereby absensation is produced ordinarily by medico-chemical agents, narcotizing the muscular tissues and nerve filaments, thereby interrupting the neural current in the sensory nerves. | 1. Asphyxia is a physical condition in which the force and functions of life are suspended or abrogated, whereby absensation is produced by the deoxidation of the blood, thus producing insensibility by preventing the generation of nervo-vital fluid and its circulation in the sensory nerves. |
| 2. In anæsthesia the pulse and respiration are nearly or quite normal as is the countenance of the patient. The patient is readily recognized as being in possession of the force and functions of life, and no danger need be apprehended from the effects of the anæsthetic. | 2. In asphyxia the pulse and breathing are abnormal and frequently suspended. The countenance is more or less purple, and in the third stage of asphyxia there is death-like pallor supervening the purpleness. This may be readily recognized as the first stage of death. |
| 3. The anæsthetic agent must have sufficient free oxygen to properly support combustion and sustain life. | 3. An asphyxiant must be deprived of free oxygen, or must not have sufficient to properly support combustion and sustain life. |

Oxygen chemically combined with any other chemical element will neither support combustion nor sustain life, neither animal nor vegetable life. Therefore, nitrous oxide gas ($N^2 O$) will no more sustain life than carbonic acid gas, or nitrogen gas, or olyphiant gas, or any other inert gas. Yet many persons assert that it does support combustion, and do most emphatically declare that they have seen it support combustion when applied to a lighted taper or a piece of heated charcoal. Yet, they fail to recognize the fact that in the application of the lighted taper or heated charcoal, they have applied the necessary heat to decompose the two chemical elements and set the oxygen free, and that it is the oxygen set free that supports the combustion, and not the nitrous oxide gas. In the atmospheric air ($N^4 O$) there is no chemical union of the two gases. They are simply in a state of mixture, and the oxygen is free to move and sustain life. This free oxygen is the all-essential element in any and every true anæsthetic. Therefore, in the essential nature of this agent, there cannot be in any sense a true anæsthetic without this all important element in sufficient quantity to sustain life. It matters not what the narcotic element is, whether it be chloroform, chlorolene, ether, or any other suitable narcotic liquid as a subordinate element or any gas other than that of oxygen gas, there can be no true anæsthetic without having sufficient free oxygen to sustain life. Let these *incontrovertible* facts be settled in the mind of every one who attempts to produce anæsthesia, and the dire consequence of nervous prostration and deaths will be averted. But if we are to continue calling chloroform, ether, chlorolene, etc., anæsthetics, while, in point of fact, they are not, and at most, can only truthfully be recognized as suitable subordinate elements in a true anæsthetic, can we rationally expect anything else than frequent fatal results? In the essential character of a true anæsthetic agent, it is utterly impossible that any of the narcotic liquids, such as chloroform, ether, etc., can be an anæsthetic. While it is true that, for instance, aerated chloroform may be a true anæsthetic, yet it is equally true that it may be an asphyxiant or a paralyzant. If so, then is it not important that he who would administer, should certainly know when and why it is an asphyxiant or a paralyzing agent? As we have already stated, if there be not enough free oxygen to supply in due quantum, the red corpuscles of the blood to sustain life, it is an asphyxiant, no matter what the chemical elements may be of which it is composed, and must, without an exception, produce asphyxia, if not paralysis, by the sudden induction of a powerful drug. It may be a paralyzant when the sudden introduction of an over percentage of any powerful drug from its chemical and pathological effects, will produce a shock, or concussion, and revulsion in neural circulation. Hence, the importance of regulating and controlling the percentage of any narcotic element in the anæsthetic, so as to adapt it to the kindly tolerance of the patient, and so as not to produce either asphyxia or paralysis of the nerve centre. The "Hayes Process of, and Apparatus for Generating and Applying Anæsthetics" is the only means, so far as we know, of accomplishing this result definitely at all times. It needs only to be seen in its practical application to be appreciated by those who understand the science. Its inestimable merits will be more fully and duly appreciated when we recognize properly the inexorable laws of nature as relates to the functions of life, as well as to life itself. When we fully understand that life is dependent upon the functions of life, and the functions of life are dependent upon the force of life, and not upon life *per se*; and that the force of life, or that out of which vital force is generated by the pneumo-gastric glands of the lungs and the cerebral glands of the brain principally, is *free oxygen*, and that the presence of this free oxygen in the lungs in sufficient quantity to properly oxygenate the blood, is as essential to the continued existence of life as activity is dependent upon an active body; then, and not until then, can we properly understand the science of anæsthesia and appreciate the process that works on the line of these natural laws and secures immunity from danger to life.

To properly understand the science of anæsthesia, we must necessarily recognize the two-fold circulation in every animal independent, and yet dependent upon each other. Arterial and venous circulation is as dependent upon neural circulation in the nervous system as life itself is dependent upon the functions of life. The great heart and reservoir of the nervous system is the brain. It may be truthfully recognized as the animal electric storage battery. From the basic element *free oxygen*, which is to be in the wisdom and economy of nature supplied through the lungs to the blood and then to the brain, *animo electricity*, or as the eminent Dr. Bovee Dodds has named it, nervo-vital fluid, is generated by the glands above named, and stored in this storage battery, to be utilized and sent out in the motor nerves at the behest of the mind, or spirit, by spirit force operating upon this material force (the how cannot be known by mortal man) in such manner as to send out this animal electricity in the precise motor nerve, or nerves, that are to move the organ, or organs, that are wont to be moved, and when the volume of this electricity is sufficient to develop sufficient force to move the organs, they move, and not until then. As will be readily seen, this is the only medium through which the immortal ego can manifest itself to this physical world. This circulation through the nervous system brings back to the brain the greater portion of the electricity thus sent out through the channel of the motor nerves by the sensory nerves, and thus affords the only channel or means of receiving any impression or information from this material world. Hence, just as the blood is sent out from the heart through the arteries and is returned again, the greater portion of it, to the heart, so this nervo-vital fluid or animo-electricity is sent out through the motor nerves and is returned again, the greater portion of it through the nerves of sensation, to the brain, thus all activity and execution of this immortal Ego in this physical world, and all impressions or intelligence from this material world, are *entirely* dependent upon this circulation in the nervous system. Interrupt or arrest this circulation in the sensory nerves and you interrupt or suspend sensation. But if you at the same time interrupt or suspend the circulation of this animo-electricity in the motor nerves leading into and controlling the vital organs (the heart and the lungs), you interrupt or suspend the force and functions of life, and then you have the first stage of death. This is what is accomplished in syncope, asphyxia, and by what is commonly called shock.

True anæsthesia is entirely different and does not interfere with the functions of life. Therefore, a true anæsthetic must contain at all times sufficient free oxygen (and this is imperative) to supply the blood properly with the red corpuscles, to fill this storage battery, that the functions of life may not be interfered with; and at the same time there must not be sufficient of any powerful drug suddenly thrust into the lungs to produce what is commonly called a shock, or concussion, and revulsion in neural circulation, thus arresting the circulation of the nervo-vital fluid by the chemical and pathological effects in reflex action from the tens of thousands of nerve filiaments spread out over about 1,400 square inches, as is estimated to be in an ordinary-sized man's lungs.

Then again, it is important to bear in mind that in the administration of any anæsthetic death can only be caused either by asphyxia or by a shock, and that in no other way can death be caused by any anæsthetic agent. That a shock can only be produced by one or other of two agencies, or by both combined or acting simultaneously. The one is internal—the mind—the other is external—the intended anæsthetic agent. Direct, or control the mind so as to obviate the shock, and direct and control the narcotic element, (the percentage of the powerful drug in the anæsthetic,) so as not to produce a shock from the chemical and pathological effete, and you will not have a death from your anæsthetic agent.

### H. SQUIBB, THE CELEBRATED CHEMIST.

Says about laughing gas: "The condition of perfect anæsthesia produced from this is one of the most grave and frightful conditions of life, and by suspending more than half of vitality, *it comes so near death* that it is wonderful to reflect how near the boundary line can be approached, and yet not often passed." Again, "The occurrence of blueness or lividity of the skin, *so common when laughing gas is administered*, as also the dark hue of any flowing blood, are omens of advancing carbonæmia." Again, "I conceive that a man administering this gas should be held responsible, by law, for the life of the patient, if he has not required a certificate of fitness from the patient's medical adviser." Again, "In presenting this paper I do not desire to invite the attacks of those who fire off their invective squibs in the columns of our daily papers, to attract the notice of an easily-imposed-on community. My sole object will be attained if I succeed in intimidating some of the many who administer nitrous oxide, or laughing gas. Ignorant alike of obligations and responsibilities, these men quiet their consciences with the reflection that so many have taken it without bad consequences. The majority of those who are to-day giving laughing gas, are mere amateurs, who understand but little of the practice and less of the theory of anæsthesia. They are, therefore, totally unfitted to apply agents to the human body which, even in their safest methods of administration, jeopardize human life by interfering with its most vital functions."

[These timely words in reference to the use of nitrous oxide gas from this distinguished chemist, should cause those who have been cajoled into the use of this asphyxiant to pause and shrink from further use. We agree perfectly in the remark "that a man administering this gas, should be held responsible by law, for the life and lack of health of the patients." But we do not think that any man can be excusable for the use of the gas simply because he may have a certificate of fitness from a physician. In the first place, this gas is not a proper agent to administer, and consequently, no man, not even a physician, has any moral right to administer.—EDITOR.]

### INCONGRUITY.

"There is a stage when patients refuse to inhale more gas. There is a revulsion of respiratory muscles and deep stertorous breathing. It is dangerous to go farther, for the patient is in what may be considered an asphyxiated state. I begin operations here regardless of other symptoms. Some patients will take more, others less, before this stage is reached, and I get out as many teeth as possible during the period of unconsciousness. Sometimes it may be but one tooth, again it may be the whole upper set. The appearance of the patient is usually as follows: Jaws set, eyes protruding and rolled back (when not closed), and a bluish or purple color about lips and face. Respiration is at first shallow, then deep and stertorous. There is always a very alarming and death-like appearance, which usually frightens the novice, and expecially the friends of the patient who may be standing near; but this appearance usually passes away before the operation is completed. I consider nitrous oxide perfectly safe. Have administered it hundreds of times and have never seen an alarming symptom, though I have had my share of "fun" with fractious patients. I am satisfied the effect produced on different patients is due entirely to individual temperaments and idiosyncrasies. The most troublesome patients are of highly nervous organisms and excitable dispositions. Many possess a mortal dread of pain, and they come in with their nerves worked up to a concert pitch of excitement. Many can make themselves do what is required of them, if they have a strong will power, but soon as this will power is overcome by the effects of gas, their terrible dread of pain gains the mastery, and immediately produces an involuntary resistance; hence, the degree of anæsthesia is usually in proportion to how much the patient dreads pain."—*Malcolm W. Sparrow, D. D. S., Toronto, Canada.*

[We publish the above to show the incongruity and inconsistency of those interested in giving nitrous oxide gas. Here is a man who has administered it, according to his own statements, hundreds of times, "without having seen any alarming symptoms." And yet he says, "the appearance of the patient is usually as follows: Jaws set, eyes protruding and rolled back (when not closed), and a bluish or purple color about lips and face. Respiration is at first shallow, then deep and stertorous. There is always a very alarming and *death-like* appearance, which usually frightens the novice, especially the friends of the patient who may be standing near." Yet he considers this gas as perfectly safe. Why so? Simply because he has not killed any one, or because all whom he thus asphyxiated and put into the first stage of death, resuscitated. It scares the novice or friend, but he has become so accustomed to seeing this condition that he doesn't mind it. The same is true of others.—Editor.]

Anæsthesia.—At the Congress of the Surgeons of Germany, a table of statistics dealing with anæsthetics was presented for the fourth year. 51,846 cases are recorded: 32,745 with chloroform; 11,617 with ether: 3,896 with chloroform and ether; 760 with chloroform and ether and alcohol: 2,769 with bromide of ethyl. The average of fatal accidents is 1 in 2,587, and for chloroform 1 in 1,924. In the four years, 163,493 cases are recorded and 61 deaths. The average being with chloroform, 1 in 2,655; with chloroform and ether, 1 in 8,014; 1 in 4,890, chloroform, ether and alcohol; 1 in 26,268 with ether. Indeed, with the last drug, but one death is recorded, and it is pleasant to find that the number of cases in which ether is given has increased year by year. The fact that deaths have occurred even when Pictet's chloroform is used, tends to show that fatalities cannot in the absence of other causes, be assigned to the presence of impurities in the drug.—*London Dental Record.*

[In the above statistics we have reported results without any attempt to assign any cause for the results other than pointing to the drug used as the subordinate element in what should have constituted a true anæsthetic. Thus it will readily be seen how misleading it is to call chloroform, ether, etc., anæsthetics, while in point of fact they are not, and can only be recognized at most as subordinate elements in the anæsthetic. If a true anæsthetic had been made with the use of any of the drugs mentioned, there would not have been a single death caused by the drug. A true anæsthetic will neither asphyxiate nor paralyze. If not, how then can it produce death? Anyone who has studied the subject properly, knows that you can produce asphyxia or paralysis much sooner with chloroform than with ether, on account of the greater specific gravity of the former, and its difficulty in removal from the lungs when inhaled, as well as by its chemical and pathological effects on the nerves of sensation. But use sufficient pure air and no fatal results will follow.—EDITOR.]

Be determined to make the world better and wiser by your living in it. If you go out of it as simply a human item of selfishness, giving out nothing to advantage it, and taking in nothing but the demands of an animal, you will certainly have lived in vain.

# HYPNOTISM WITH SPECIAL REFERENCE TO HYPNOTIC SUGGESTION.

BY CHARLES GILBERT DAVIS, M. D., M. S. A.

[Dean of The School of Anæsthesia, Chicago.]

Currents of human thought, like the tidal waves of the sea, may often be traced, outlined, measured and foretold. As we glance out upon the vista of life to-day, and view the ever-changing panorama of thought and action, it takes but little discernment to discover a manifest inclination on the part of the leading minds of the world to study the psychical side of human existence. Never was there a time in the history of the race when the mind was so restless. Not for two thousand years has the world waited with such breathless expectancy and hope for new light to be given, to enable us to discern our relation to a universe of intelligence. Everywhere is a restless movement of advance. The scenes are shifting rapidly. The evolution of the human mind is progressing at a remarkable rate of speed. The beliefs, theories, and entire educational foundations of our childhood are often overtured in a day. Indeed, so accustomed are we to this rapid transformation, that we are not surprised, at any time, to find the heresy of to-day become the orthodoxy of to-morrow.

Amid these changing scenes truth is always found invincible, while superstition, bigotry and ignorance, standing ever in the path of progress, are rapidly giving way. In all branches of science, we find this power of resistance. It is so in the political world; it is observed in theology, and nowhere is it more manifest than in the science of medicine. But wisdom increases. Light is coming in through the windows. Though we are yet children, playing among flowers, breathing the balmy air, and listening to the sweet tones of a universe of joyful sounds, yet are we growing more acquainted every day with our environments. Life does not seem so strange and weird as it did one or two thousand years ago. Nature is not so mysterious, and God not so far away. We are being taught —receiving suggestions through the avenues leading to the conscious ego. Light is coming in through the windows, hearing, seeing, smelling, tasting, feeling, and perhaps another window that is yet but dimly seen through the twilight of our nineteenth century knowledge.

The suggestions made through these various channels, are being carried to the receptive centers of the brain, and there recognized and utilized for the purpose of carrying on the progress of evolution, which is slowly, but surely, lifting man from an ignorant past to an intelligent future. Through these avenues, the human mind is receiving nourishment. Through these senses force is entering into the conscious ego; and the reults is change—wisdom—growth.

With this knowledge we must then admit that thoughts are entities, or manifestations of force. Intellegence, intellectual growth depends upon the kind of suggestions received, the rapidity with which they are received, and the ability of the recipient to utilize them. Recognizing the necessity for suggestion, we would next inquire as to the best condition in which to place the recipient to make suggestion most effective.

It has always been observed that, when the nervous system is calm and quiet, ideas are most easily transmitted to the seat of consciousness, and when so transmitted, make the most powerful and lasting impressions. Hence, if we desire to make a sudden and lasting impress on the mind, we first soothe or tranquilize it, and then with decided and forcible utterance, literally drive the thought in. And this, stripped of all the hyperbole of theory, hypothesis, fiction, sentiment and nonsense, is hypnotism.

Of course, I am viewing this subject with a physician's eyes. I am looking at it from a practical standpoint, being well aware of the many hypotheses that have been advanced. I do not say that these few statements constitute all that there is of hypnotism, but, so far as I know, it includes the limit of present scientific knowledge on the subject. But I shall not pause and attempt to fathom the ocean of the unknown. I shall not enter into the metaphysical question, relating to the duality of the mind, nor discuss the possibility of an astral emination. Let us rather endeavor to intelligently classify and arrange the facts that we know to be proven, and, reasoning from the premises we possess, let us pursue the truth.

Hypnotism was so named by Mr. Braid, the Manchester physician, who studied the subject about the year 1841. The peculiar drowsy or sleepy condition, coming on from fixed attention during his experiments, caused him to refer for a name to the Greek word "Hupnos." This science has had a variable career, and those who have dared to openly study it, have suffered from the malicious slings of the ignorant.

But when we look back over the history of the progress of medical science, and remember that Ambrose Pare, who advocated the use of the ligature, was ostracised, that Harvey, the discoverer of the circulation of the blood, was mobbed, and that Jenner, who bestowed a blessing upon countless generations of humanity, was called a charlatan, we are not surprised that those who enter upon the study of these psychical questions which pertain to the highest elements of man's mentality or spiritual existence, should meet the opprobrium of non-progressive, materialistic, unscientific stupidity. The highway along which has advanced the car of the healing art is ornamented with the shrines of crucified medical martyrs. They were once scourged by the mob, but the world now builds monuments to their memory, and writes their names high on the scroll of immortal fame.

But hypnotism is rapidly assuming its position as a science. There is no longer any doubt as to the efficacy of hypnosis as a therapeutic agent, and I prophesy that before another decade has passed, it will have become quite fashionable. Every year, every day, we are recognizing, more and more, the wonderful power of the mind over the bodily functions. Evolution is doing its work. Physically, man was completed ages ago. The human form has not perceptibly improved in beauty of outline since the days of ancient Greece, but in breadth of intelligence, in spiritual gifts, in mentality, in all the nobler attributes of manhood, the work goes rapidly on. In proof of this, I can only point to the history of humanity for the last two hundred years.

I need not dwell upon the history of hypnotism. The subject has received so much attention in recent years, that its history is now quite familiar to the intelligent public. It is sufficient to say that there are at the present time two schools, differing somewhat in their teachings. The Salpetriere School of Hypnotics contends that hypnotism is a disease, that it may be studied from a physiological standpoint, and that suggestion plays an unimportant role; while the School of Nancy tells us that it may be best studied on health subjects, and that the basis of it all is, suggestion. The controversy between these two centers of investigation has done much to elucidate the subject. No hypothesis thus far advanced has been sufficient to account for all the phenomena, but we are accumulating facts, and in due course of time will be able to methodically arrange and classify them, and so bring hypnotism to occupy a scientific basis.

Let us examine carefully some of the facts. In any case of hypnotism, before we make our final suggestion, we usually suggest a quiet or calm condition of the nervous system. This we call hypnosis. If asked for a definition, I would say that hypnosis is an induced traquilization of the nervous system, in which the will is, more or less, in abeyance, and the mind open to suggestion.

While the patient, or subject, is in this state of sleep, or hypnosis, we may then, through the senses, send impressions to the brain, and this is hypnotic suggestion, which differs greatly in degree from simple suggestion.

During the ordinary occurrence of every-day activities, we are, throughout our normal lives, receiving suggestions from various sources, which leave their impressions. We have words spoken to us, we listen to the sounds of nature, the eye has ever the panorama of life before it, and all of these impressions, carried to the brain, act on the individual in a way which we may term simple suggestion. But when the mind has been tranquilized, and the subject has passed into the condition of sleep, or languor, which we term hypnosis, then we may make suggestions, and find them far more effective than in the waking state. This we term hypnotic suggestion, and it is undoubtedly far more effective, far-reaching, and powerful than simple suggestion.

The great motive power that is to-day lifting mankind from the shadows of the past up to the beautiful intellectual heights of the nineteenth century is suggestion. Every beautiful thought, every flight of poetic fancy, every grand burst of melody, every column, peristyle and spire of architectural splendor that reflects the sunlight—all were born through suggestion. All the world is a constant scintillation of mind, suggesting to mind. The evil thought is impotent, short-lived, and dies, while that which is born of good, is powerful, lives and develops. A suggestion, coming from one mind and conveyed to another, carries force. How much force, depends largely upon who made the suggestion. When we know how to measure this force, then we will know how to formulate the law of suggestion.

If required to formulate the law of suggestion, I should say:

1. All impressions, carried by the senses to the center of conscious or sub-conscious life, convey power.

2. That the impression is greater and more lasting in proportion to the number of senses simultaneously impressed.

3. That some men possess greater power of projecting thought than others.

4. That the impression made on the mind by the thought of another depends upon the force with which the thought was projected, and the resistance which it meets.

5. That impressions of thought, sent to the brain, are increased many fold if the mind is previously tranquilized, and thrown into a state of hypnosis.

One of the most noticeable facts in life is the great difference in the capacity of various individuals to make impressions, and command obedience through suggestion. Men differ widely in their physical capacity; so they do in psychical force. Some men may hurl missiles with greater force than others; so some may project their ideas with greater effect than others. One man may address a jury, and the effect of the speech is only soporific. Another attorney addresses the same jury on the same subject, and immediately every man is alert, wide awake, and fully convinced that he is listening to the truth. Why is this? Because the last speaker knew how to drive his thoughts in like javelins. He knew how to suggest forcibly.

One of the most notable examples among the minds of men in this capacity was Napoleon Bonaparte. Among his associates in the army, in the councils of the nation, his word was law. A look, a motion, a few quietly uttered words were sufficient to command obedience. All felt the mystic spell of his power.

Note the instance when Marshal Ney had been sent by Louis XVIII. to arrest the emperor on his return from Elba. No sooner did the marshal come within the spell of Napoleon's powerful suggestive genius, than he himself surrendered to Napoleon, and the combined forces marched against the king.

In reading the history of France, I have sometimes imagined that Napoleon must have hypnotized the entire French nation, and then died without removing the spell of his genius. A suggestion of his spirit still broods over the land.

The most wonderful phenomena of suggestion the world has ever witnessed are probably those related in connection with the miracles of Christ. That He performed miracles, history, both sacred and profane, admits. Because these works of Christ were apparently a deviation from the known laws of nature, is no evidence whatever that they were entirely beyond the pale of law. There is no such thing as the supernatural; it is only the superusual that give us cause to wonder. If we had never seen the sun rise, on witnessing it for the first time, we would look upon it as a miracle. It is unreasonable to presume that these miracles were performed without the operation of the principles of law. The more I have studied them, the more I have become convinced of this. Christ evidently understood every impulse of the human soul. There was no phase of character that he did not read at a glance. He knew the value—the strength of words. He could play upon the thoughts of men as easily as a musician can bring harmonious sounds from a musical instrument. In a careful study of His various utterances, how easily we detect the thread of faith, hope, expectancy and belief, along which ran the suggestive thought or word to be carried to the consciousness of the recipient, and there produce the desired effect.

In the case of the man born blind, I do not for one moment believe any theologian will contend there was any efficacy in the ointment, made of the clay and applied to his eyes, nor in the water of Siloam, in which he was told to wash. But in the light of modern science, we can readily understand how these acted as powerful conductors of suggestive force.

Faith, hope, expectancy and belief are powerful, therapeutic agents, and Christ undoubtedly well understood the law of applying these in a suggestive sense to relieve humanity. To say that Christ worked beyond the pale of natural law is unreasonable. Through all ages of mankind, we have caught occasional glimpses of the manifestation of this force. How often are we able to say to-day: "Thy faith hath made thee whole." Notwithstanding the ignorant bungling and unscientific manner in which the application has been made, we must admit that much good has been accomplished, and many diseases cured through the "Christian Scientist," "Mind Cure," or "Metaphysician." These should be classified where they belong, as cases of suggestion.

The world to-day is full of illustrations of the workings of this law of suggestion through faith. The physician who can arouse it, and carry it along the lines of known scientific truth, is capable of reaching the highest pinnacle of professional usefulness in the age in which he lives. Many people have recently been cured at Lourdes, in France. Thousands have left their crutches at the shrines of saints and gone away, rejoicing. Multitudes have touched what they supposed was a piece of the true cross and were healed. Shall we not learn a lesson from this? Shall we not grasp this suggestive force and utilize it for the good of man? Shall we not chain these potential energies and harness them to the car of progress?

Under no circumstances do we see this law of mental influence so powerful as when associated with religious ideas. Among the great multitude of mankind, it is observed that a life, lived in harmony with religious belief, is essential to good health, or recovery from disease. I have seen many a Catholic woman restored from years of suffering by sending her back to the folds of her church, from which she had wandered, but in whose tenets she still believed. I have seen the rose return to the faded cheek of many a girl, who had been reared and educated under strict religious discipline, on persuading her to return to the path of Christian duty. I verily believe that an outraged conscience plays an important part in nine-tenths of all chronic ailments.

This wonderful influence of the mind over the body, and our ability to regulate it through suggestion, is just beginning to be thoroughly recognized. How it may be utilized in many ways for the happiness and advancement of mankind, I will not stop here to enumerate. Although I might dwell at length upon its legal and educational aspect, I shall leave this for future consideration, and speak briefly of its medical application.

Possibly no therapeutic agent has played such an important role in the healing art as suggestion, and I might also add, that no other has received so little credit for what it has accomplished. To prove that suggestion has been the chief agent in healing the sick, we have only to point to the various schools of medicine, whose teachings are often diametrically opposite, and yet their success is not materially different.

In looking over the field of work from the infinitesimal doses to the most heroic of medication, the public are unable to detect any marked difference. The distinction is only noticeable when we observe individuals. The remedies enumerated in the healing art are numerous—their name is legion. Medicines that are useful in a practical sense are rare. I do not mean to decry the use of medicine. It is useful—as much so, when required, as food. In many instances it is food, and yet how very much of it is like the clay applied to the blind man's eyes—only the thread, along which runs the current of faith to suggest the cure.

Our doctors have been too materialistic, our so-called metaphysicians, Christian scientists and mental healers too ignorant of medicine and the law of suggestion. The work should be combined. We cannot ignore the body. We cannot do without either food or medicine. Hunger and thirst may well be classified as disease. What are the remedies? Bread and butter, beefsteak, potatoes, and pure water. Show us how to do without these, and then we can think of dispensing with medicine of all kinds.

The power of suggestion should be taught in our medical colleges. It will be some day. In the near future, we doctors will gather up all of these psychical ideas, embody them in a code, showing profound erudition, stamp them with a name of "learned length and thundering sound," call them ours, and defy any other man to use them on pain of instant excommunication. We have opposed hypnotism for many years, and now we are thinking of getting a copyright on it.

The enormous accumulation of facts, relating to the psychical side of human life, are constantly demanding a closer study of these questions. There can no longer be a shadow of doubt as to the wealth of these undiscovered fields. The legal and educational aspect of the subject is enormous. When we more thoroughly understand the laws of suggestion, we will be better able to unfold the minds of the young. The present effort that is being made in the way of teaching by symbols is a splendid illustration of the workings of the law of suggestion, by appealing simultaneously to several of the senses. Under all ordinary circumstances, simple suggestion may be used, but when through hereditary transmissions, or the accidents of disease, severe mental abnormalities or perversions are present, we may resort to hypnotic suggestion. I have seen a few illustrations of this, sufficient to warrant my belief in its practical use.

But the medical uses to which hypnotism may be applied are to-day attracting much attention. I might illustrate this by citing the history of numerous cases, that have come under my own professional observation, but it would not fall properly within the province of this paper. I believe, however, we are scarcely within the suburbs of this great subject. I am convinced there is no rational being, suffering from functional disease, but what may be benefited by this treatment, and I have sufficient evidence of marked improvement in organic disease to warrant me in redoubling my efforts and researches in this direction in the future.

I feel that within the narrow limits of this paper, I have scarcely touched upon the boundaries of the great subject of hypnotism. The more we study it, the greater are the number of avenues, which we find opening up and leading to new chains of thought. We have scarcely spoken of the sixth sense. Are there no means of communicating with consciousness, excepting through the five senses, hearing, seeing, smelling, tasting and feeling? I must confess that some of my experiments have lead me to believe in the existence of this psychical sense. I have time and again communicated with a hypnotized subject, apparently without the aid of the five physical senses, but I have not repeated these experiments sufficiently often to announce them as scientific facts, and hence refrain from dwelling on this branch of the subject. I shall probably allude to these experiments in another paper. I have seen sufficient to convince me that thought transference is one of the possible coming facts, and while dwelling on this subject, what thoughts come to us. If telepathy can be used to transmit messages around the world, why not also to the other planets of our solar system, and even to the utter limits of intellegence, wherever it may be manifest within the confines of space? Who can set a limit to the powers of heaven-born spirit? Are we not justified in believing that man will never rest till he has explored the universe.

The human brain is a microcosm of boundless forces. As far as thought extends, so far reaches the power of man. It is well that we pause and study for a while our own latent capacities. It is possible that we contain within ourselves energies, whereby we may yet be able to manifest God-like power, gain greater control over physical life, and cure what has heretofore been considered incurable disease.

For does not history tell us, that by the same means even the dead were raised?

Humanity is yet in its childhood. We do not yet comprehend our growing strength. Let us turn for light to the God within us. When we more thoroughly know ourselves, and know how to apply this force of suggestion, then will the education of the young no longer be a task, but a pleasant pastime.

Through the suggestive power of symbols or object lessons, the light will come to the young mind through several windows, and the child be led, step by step, easily through the labyrinths of thought. The development of the young life will be like the unfolding of the petals of a beautiful flower, without effort, and full of the joy of existence.

Much is being done to-day in the way of treating diseases by hypnotic suggestion. My own opinion is that this method will rapidly increase. The nineteenth century has brought to light no therapeutic agent more powerful or more capable of usefulness than hypnotic suggestion, and I verily believe the twentieth century will find none so generally applied. Surgery and hypnotic suggestion will largely constitute the healing art of the future. It may not be in our day, it may be centuries hence. But it will come. Man contains within himself fountains of health and youthful vigor, waiting to be unlocked.

Let us reverently and hopefully explore this new field of knowledge. Let us turn awhile from war, the greed of gain, the strife of life, and the sorrow of pain, to look for a greater happiness. The night around us is dark, the storm rages, the billows are high. Let us look and listen; for comes there not a new light, a new voice, and a new hope, to which humanity may cling?

# COMMENTS ON ANÆSTHESIA.

BY PROF. J. M. CLYDE, D. D. S., M. S. A., SPRINGFIELD, MO.

What is anæsthesia?

It is defined by Dr. Hayes as "a physical condition in which the force and functions of life are in continuance under modification whereby absence of sensation is produced."

This condition is induced by such agents as the vapors of chloroform, ether, chlorolene, etc., mixed with air in due proportion and properly administered.

In asphyxia, there is a want of sensation, but the physical condition is not that embraced in the definition. If the definition be correct (let him who denies it give us a better), then asphyxia, if profound, whether produced by nitrous oxide, or some other agent, is not an anæsthetic condition; for the vital forces are not in continuance under modification, but are suspended.

In anæsthesia, the heart and lungs must be in a state of activity, but with the agents we have, even with the best means of administration, there is of necessity a modification of the vital functions. Had we an agent (or sufficient skill to apply those we have) capable of producing a want of sensation without interfering in the least with the functional activities, we could produce a *perfect* anæsthesia; that is, one absolutely free from all unfavorable sequences. This is the ideal to which we wish to attain, and for which our school is striving.

Permit me here to venture another definition of anæsthesia, viz.: It is the result of a disturbance, a change or modification of the nervo-electric vibrations. I throw this out for investigation; and, if the few thoughts I shall present will stimulate any one to solve this interesting problem, and give us a correct physiological definition, I shall not have penned them in vain. Let some one who knows, or thinks he knows, give us the result of his study. By the friendly interchange of opinions the truth may be developed.

The question is, what *is* anæsthesia, and *how* is it produced? Let any one attempting an answer confine himself to the IS and the HOW, if he would develop anything new.

As to the theory of vibrations, allow me to advance the following, though it may appear chimerical: How is the sensory impression changed into a motor impulse? It is generally admitted that light, heat, sound, electricity, etc., are transmitted in waves, or vibrations. The vibrations of light are inconceivable. At one end of the solar spectrum we have red light. Its vibrations are estimated at 480 trillions per second; at the other extreme of the spectrum, the vibrations are computed at 720 trillions, and the color is violet. It appears, therefore, that the difference in the number of vibrations gives us a difference in color, and the same may be said of the intermediate colors.

It has been estimated that the transmission of impressions through the sensory nerves is about 140 feet per second, and the motor impulse about 110 feet. May it not be that the sensory impression is converted into a motor impulse by a change in the velocity of the vibrations? If light, heat, chemism, etc., are but different manifestations of the unit force, convertible the one into the other, is it unreasonable to suppose that sensation is a form of force, convertible into motor impulse, just as heat may be changed into mechanical force?

Again, suppose that sensation travels at the rate of 140 feet per second through nerves in normal condition, but when they are narcotized it can travel only half that distance, may it not be that it fails to produce its physiological effect on the nerve centers, on account of its slow rate of travel, and that this is the philosophy of anæsthesia? If anæsthesia is the result of diminished conductivity of the sensory nerves, produced by the chemical action of the narcotic, changing their texture (if this be true) so as to interfere with their normal vibration, is not the result similar to a defect in the line of connection in telegraphy, and hence the absence of sensation? *Sit lux.*

# ESTABLISHED FACTS RELATING TO ALCOHOL AND OTHER ANÆSTHETICS.

BY N. S. DAVIS, M. D., LL. D., CHICAGO, ILL.

1. The three well-known anæsthetics in common use—ether, chloroform, and alcohol, each and all, when received into the blood, either by inhalation, hypodermic injection, or by the stomach, first suspend the sensibility of the cerebral hemispheres (unconsciousness or anæsthesia), and next they suspend in succession or simultaneously the functions of the respiratory, vasomotor, and cardiac nerve centers, or ganglia, thereby suspending life. It is hardly necessary to adduce proof of this proposition, as it is familiar to every practitioner of medicine and surgery.

2. Each of these three anæsthetics acts on the nervous centers in the same direction, and consequently each intensifies the action of the others, whether given together by inhalation, as in the A. C. E. mixture, or separately by different methods, provided they are present in the blood at the same time. The correctness of this proposition is demonstrated by the experiments of Dubois, in 1883, and still more fully by those of H. C. Wood, as detailed in his "Address on Anæsthesia" to the Tenth International Medical Congress, Berlin, 1890, and by many carefully observed clinical facts.

3. The action of these three anæsthetics—alcohol, chloroform, and ether—on the cerebral, respiratory, vasomotor, and cardiac nerve centers, is not only in the same direction, but that direction is one of *diminished sensibility* or paralyzant in direct proportion to the quantity used. This has been so perfectly demonstrated by the well-known experiments of Sidney Ringer and Sainsbury; Professors Martin and H. C. Wood; David Cernay, J. H. Kellogg, and others, particularly in regard to the action of alcohol, that it must be admitted as an established fact, or we must deny the value of all experimental therapeutics.

4. These anæsthetics not only directly diminish nerve sensibility and force, but their presence in the blood so modifies the action of the hemoglobin, corpuscular elements, and albumen, as to diminish the reception and internal distribution of oxygen, and to lessen the activity of the cell nuclein and leucocytes; and consequently they lessen all metabolic and natural excretory processes. The correctness of this proposition is sustained by an amount of both experimental research and clinical observation sufficient to fill a fair-sized octavo volume. So far as relates to the action of alcohol, the reader will find these proofs alluded to more in detail in a paper prepared by me for the World's Temperance Congress in Chicago, 1893, and published in the second volume of "Temperance in all Nations," 58 Reade Street, New York, and also in an interesting volume, "On the Effects of Alcohol," by Dr. J. E. Usher, London.

5. When alcohol, or either of the anæsthetics named, is retained in the blood but a few hours, as is usually the case when administered for strictly anæsthetic purposes, the effects mentioned in the four preceding propositions soon disappear. But when the dose is repeated sufficiently often to keep it pretty constantly present in the blood and tissues for weeks, or months, or even years, as when alcohol is administered liberally from the beginning to the end of many of the acute general fevers and some chronic affections, or drank in the form of beer, wine, or distilled spirits as a beverage, the consequent impairment of nerve sensibility and force, and the coincident impairment of oxidation processes necessary for healthy tissue metabolism and excretion, directly encourage fatty or atheromatous degenerations in almost every tissue in the body, and especially in the stomach, liver, lungs, heart, and kidneys, as may be seen illustrated in every case of chronic alcoholism. It is this effect of alcohol in diminishing the internal distribution of oxygen, and also the activity of the nuclein and leucocytes of the blood, that makes the individual using it more liable to attacks of almost every variety of acute disease, whether epidemic or endemic, and lessens his vital resistance when attacked. So true is this, that every modern writer of

note on practical medicine tells us that even habitual *moderate* drinkers of alcoholic liquor give a much higher ratio of mortality when attacked with cholera, continued fever, pneumonia, influenza, or almost any other acute disease, than the total abstainers. Even the more intelligent part of the non-professional public have come to quite generally recognize this inherent and inevitable power of alcohol to impair man's physical power and activity, and hence they prohibit its use in all circumstances requiring the highest degree of activity and endurance, whether mental or physical. Having stated as plainly as possible the five foregoing propositions, and believing their correctness to be capable of abundant proof, I will ask a few questions of very great practical importance both to the profession and the public:

1. If alcohol, when taken into the living body, directly diminishes nerve sensibility, muscular force, and so alters the constituents of the blood as to retard both the internal distribution of oxygen and natural tissue metabolism in direct proportion to the quantity taken, why do we continue to speak or write concerning it, or to use it, as a *stimulant heart tonic, or restorative agent?* Is not such a designation untrue, and directly calculated to perpetuate errors of the most destructive character, both as regards its use as a medicine and as a beverage? Why not give it its true designation, *i. e.*, an anæsthetic and organic sedative; and to be used only as such?

2. If the presence of alcohol in the blood directly diminishes respiratory, vasomotor, and cardiac nerve force, and retards the reception and internal distribution of oxygen, what possible indication can there be for its use in such diseases as pneumonia, diphtheria, typhoid fever, etc., in which all the functions just named are already below the natural standard? Would not its presence not only still further depress the respiratory and vasomotor functions, but also by retarding the internal oxidation and metabolic processes, help to retain in the system both the specific toxic agents and the natural products of tissue changes, and thereby increase both the duration of the disease and the danger of final exhaustion?

3. Does not an accurate study of the history of therapeutics show that the greater the amount of alcohol or other anæsthetics used in the treatment of the general acute diseases, especielly those named under the preceding head, the higher has been the average ratio of mortality?

4. If alcohol and other anæsthetics actually diminish cerebral, respiratory, and vasomotor functions in proportion to the quantity used, why administer them to any patient coincidently with strychnine, digitalis, strophanthus, convallaria, cactus, or other direct cerebro-spinal, respiratory, and vasomotor tonics? As both direct experiment and clinical observation have proved that strychnine, digitalis, etc., most reliably antagonize the effects of alcohol and chloroform, is it not the climax of therapeutic inconsistency to give a patient a hypodermic injection of strychnine and at the same time fill his stomach or rectum with whisky or brandy?

5. How is it possible to determine the real value of the antitoxin serum in the treatment of diphtheria, if the patient is given at the same time liberal doses of a toxic bacterial product in the form of wine, whisky, or brandy? And if these latter are omitted, or their quantity greatly reduced, how shall we know whether the increased ratio of recoveries is owing to the virtues of the antitoxin serum or to the omission of the toxin, alcohol? Having carefully noted the published results of the treatment of diphtheria by antitoxin serum, as given in the best medical periodicals, I find a very large proportion of the cases so imperfectly described as to render them of no value in determining practical results. In many cases, nothing is said about any coincident use of other remedies; in other cases it is simply said that stimulants and nourishment were given, but what kind or amount is not stated; in still other cases the administration of quinine, iron, etc., is mentioned in addition to stimulants and nourishment; and in one case reported in *The British Medical Journal*, the child, 6½ years old, presenting symptoms of an average case of diphtheria without laryngeal obstruction, was treated with antitoxin and was represented as progressing very favorably until the fifth or sixth day, when a

moderate antitoxin injection was given and six ounces of brandy ordered to be given the succeeding twenty-four hours. The next day the child was cyanosed, and soon died. Can any one be quite certain whether this last case died from the toxin of diphtheria, the antitoxin, or the torula cervisæ toxin in the six ounces of brandy?

Is it not practicable to have three or four hospitals admitting diphtheria patients supplied with a sufficient quantity of some one of the reliable antitoxin preparations and then make a fair test of its efficacy by treating in parallel beds with good air, rigid cleanliness, and good milk for nourishment, but no alcoholic stimulants, two series of cases as nearly alike in severity as possible. To one series of cases, let the antitoxin, or antitoxin serum be given in strict accordance with the most approved rules, and no other internal remedies. To the other series, let just enough calomel be given during the first or second day of the attack to procure one or two intestinal evacuations, and let this be followed by small but frequently repeated doses of a solution of bichlorid of mercury and belladonna until the diphtheritic membrane begins to break up, which is generally between the fourth and sixth days, then substitute suitable doses of tincture of chloride of iron and quinine until the case is terminated. Let the most complete record possible be made in both series of cases, and then we shall have data that are parallel or comparable, and from which the most reliable practical conclusions can be deduced. If, in cases in either series, the disease invades the larynx sufficiently to demand it, intubation, or tracheotomy should be performed, as in other cases. The results of the two series of parallel cases thus managed would not only be comparable with each other, but both would be comparable with the results of the liberal alcoholic and all other methods of treatment in vogue. —*Journal of Inebriety.*

# THE DISCOVERY OF ANÆSTHESIA.

[From the Dominion Dental Journal, Editorial.]

THE DENTAL AND SURGICAL MICROCOSM reappeared last month after a temporary suspension. The journal is devoted chiefly to the art and science of anæsthesia, which its Editor claims to have revolutionized by a new apparatus and a new process of application. The Editor does not hesitate to assert that when he writes upon the subject of anæsthetics he does so *ex cathedra*, and unquestionably, from time to time, he has shown the scientific spirit of inquiry, and the correct application of terms. However, it is not our object at present to discuss the question as to whether or not nitrous oxide is an anæsthetic or an asphyxiant, a question that *must* be discussed and decided. In the November number of the *Dominion Journal*, we gave extracts to prove that Dr. Horace Wells did not "discover" the anæsthetic properties of nitrous oxide, though, as the resolution of the American Dental Association, in 1864, correctly declared, to him belongs "the honor of *the introduction* of anæsthesia in the United States." We quoted Harris, Garretson, Flagg, the "History of American Dentistry," and the *Cosmos*, as sufficient *American* authority that Sir Humphrey Davy was the discoverer of the anæsthetic effects of nitrous oxide.

The Editor of the MICROCOSM has rather a severe criticism on the work done by the committee appointed to celebrate the fiftieth "anniversary of the discovery of anæsthesia by Horace Wells." With some of his remarks we cannot agree; but he takes an impartial view of the historical facts, and entirely frees himself from any of that silly national predilection, which is more at home in a lunatic asylum than in a dental controversy. It needs but a tyro in logic to expose the *reductio ad absurdum* of those who make the claim for Wells. While admitting that anæsthesia was discovered centuries ago, and while stating that Sir Humphrey Davy first suggested in 1800 the use of nitrous oxide in surgery, and actually submitted to the cutting of the gums over an erupting wisdom tooth, *for the express purpose of testing the properties of the gas*, and in which he declared there was no pain, the essayists and the editors persist in claiming as the "discoverer," a very worthy gentleman, who, at the period of Davy's discovery, was either unborn or a mere child. Dr. Horace Wells did not "discover anæsthesia by nitrous oxide." Dr. Wells was not even the first to apply it in surgery, as the facts above prove. But Dr. Wells was the first *in* America to *introduce* it. Nothing more nor less can be said.

We suppose we will again be accused of the puerile charge of insulting "American" dentistry because we ask to have no hair splitting over a simple English word. When dictionaries do not differ as to the meaning of the word "discoverer," why should dentists? Had Davy merely suggested the idea that nitrous oxide was capable of destroying pain, and gone no further, he would not have deserved credit as the discoverer. But it is on record that while Superintendent of the medical school at Bristol, in 1799, he experimented with it, inhaled it himself, had an operation performed in his own mouth painlessly, and then announced its anæsthetic properties, and suggested its use in surgery. To pretend that such scientific investigation is not a true discovery is to play with the vocabulary. Had Davy been a dentist, no doubt he would at once have used his discovery. The greatest discoverers frequently leave practical results for those who follow them. No one pretends that Wells was ignorant of Davy's discovery. No one pretends that he was the first to know or perceive the effects of nitrous oxide. Even had he been so ignorant, the revelation which he made to himself would not entitle him to be proclaimed as "*the discoverer.*"

We give place to the above from the pen of our esteemed brother, Prof. W. George Beers, who has the courage and nerve to advocate truth and turn down error and sham no matter where found nor by whom advocated that the dental profession at large may be benefited in the expose. While Dr. Beers does not claim to discern clearly the essential difference between an asphyxiant and a true anæsthetic or a paralyzant and refuses to discuss "the question" as he puts it in his editorial as to whether nitrous oxide is an asphyxiant or an anæsthetic, yet not one of the noted advocates of "the discovery of anæsthesia by Dr. Wells" will dare to question the truth thus forcibly uttered by the editor in reference to this blatant assumption of discovery.

It would seem like great injustice and ignominy to insinuate that these zealous advocates of "Wells as the discoverer of anæsthesia" are utterly ignorant of the nature of a true anæsthetic or of the meaning of the word "discover," or that they are influenced and controlled by the dental syndicate of dealers in nitrous oxide, and yet if not, we are utterly at a loss to find a *motive* or any *justifiable* grounds on which to base the cause of this most remarkable and irrational act. True, our criticism may seem severe when considering the general intelligence and character of the men and the association engaged in this incongruous act. Yet when applied to this dramatic act itself it is certainly none too severe, especially when the health and life of the suffering are so much dependent upon the influence thus exerted.—Ed.

## MEMORANDA RELATING TO THE "DISCOVERY OF ANÆSTHESIA.

[Boston Letter from the Critic, New York City, November 17, 1894.]

"The fifty-three 'Immortals' of Massachusetts, have been selected. In other words, upon the base of the dome in the chamber of the House of Representatives in the new State House will be inscribed the names of fifty-three sons of Massachusetts selected as representing the highest fame of the commonwealth. Some names, according to Senator Hoar, deserving to go in this list, will have to be omitted for lack of room, but, as Lieutenant Governor Wolcott says, the list has been approved by the governor and his council, and the names have been selected in such a way that each shall either mark an epoch or designate a man who has turned the course of events. Probably the selection, taken altogether, will be regarded as just. In that list stand Prescott, Motley and Parkman. There, too, are Emerson, Hawthorne, Holmes, Bryant, Longfellow, Lowell and Whittier, while Carver, Bradford, Endicott, Winthrop, Wane, Pickering, Knox, Lincoln, John Adams, John Quincy Adams and Quincy are among the early patriots thus honored. Howe, the husband of Julia Ward Howe, the great worker for the blind, and tutor of Laura Bridgman; Morton, who discovered the safe use of ether; Copley, Hunt, Edwards, Channing, Brooks and Morse are also there, together with the great statesmen—Webster, Sumner, Wilson, Andrew, Choate, Everett, Phillips and Garrison. Among the latter names are those of Devens, Bowditch, Pierce and Agassiz, while Bell, the inventor of the telephone, is the only man still living who is included in the list. These names will indicate the general drift of the selection.

And in this connection it is believed that the two accompanying letters from Dr. Oliver Wendell Holmes, one of them of recent date, and both published in the New York *Medical Record* of December 22, 1894, in the following communication will be of interest.

### "ORIGIN OF THE TERM ANÆSTHETIC."

*To the Editor of the Medical Record:*

SIR—I notice in your issue of December 8, an account of a conversation upon this point, between Mr Edgar Willett and Dr. Oliver Wendell Holmes, when the latter was in England, in 1886.

It is quite possible that Dr. Holmes had forgotten that he had, in 1849, written to Dr. Morton a letter elaborately analyzing the varied appropriateness of several terms, and I take pleasure in sending to you from among my father's correspondence a copy of Dr. Holmes' original letter, exactly corroborative of the conversation above referred to. Dr. Holmes' letter reads as follows:

“Boston, November 21, 1846.

“MY DEAR SIR—Everybody wants to have a hand in a great discovery. All I will do is to give you a hint or two, as to names, or the name, to be applied to the state produced and the agent.

“The state should, I think, be called ‘anæsthesia.’ This signifies insensibility, more particularly (as used by Linnæus and Cullen) to objects of touch. (See ‘Good-Nosology,’ p. 259.) The adjective will be ‘anæsthetic.’”

“Thus we might say, the state of anæsthesia, or the anæsthetic state. The means employed would be properly called the anti-æsthetic agent. Perhaps it might be allowable to say anæsthetic agent, but this admits of question.

“The words antieuric, aneuric, neuro leptic, neurolepsia, neuro etasis, etc., seem too anatomical; whereas the change is a physiological one. I throw them out for consideration.

“I would have a name pretty soon, and consult some accomplished scholar, such as President Everett or Dr. Bigelow, Sr., before fixing upon the terms, which will be repeated by the tongues of every civilized race of mankind.

“You could mention these words which I suggest for their consideration; but there may be others more appropriate and agreeable. “Yours respectfully,

“O. W. HOLMES.”

“DR. MORTON.”

While upon this subject, it may interest your readers to read another letter of Dr. Holmes’, written forty-seven years later on—in fact, only a few months before his death—wherein no failure of his vigor or felicity of expression is wanting. This letter, now in the possession of the writer, has been published only in part, in the August number of the *Century Magazine* of the present year, in an article entitled “Dr. Morton’s Discovery of Anæsthesia.” It reads as follows:

“Boston, April 2, 1893.

“MY DEAR SIR—Few persons have or had better reason than myself to assert the claim of Dr. Morton to the introduction of artificial anæsthesia into surgical practice. The discovery was formally introduced to the scientific world in a paper read before the American Academy of Arts and Sciences by Dr. Henry J. Bigelow, one of the first, if not the first, of American surgeons.

"On the evening before the reading of the paper containing the announcement of the discovery, Dr. Bigelow called at my office to recite this paper to me. He prefaced it with a few words which could never be forgotten.

"He told me that a great discovery had been made, and its genuineness demonstrated at the Massachusetts General Hospital, of which he was one of the surgeons. This was the production of insensibility to pain during surgical operations, by the inhalation of a certain vapor (the same afterward shown to be that of sulphuric ether.) In a very short time, he said, this discovery will be all over Europe. He had taken a great interest in the alleged discovery, had been present at the first capital operation performed under its influence, and was from the first the adviser and supporter of Dr. W. T. G. Morton, who had induced the surgeons of the hospital to make trial of the means by which he proposed to work this new miracle. The discovery went all over the world like a conflagration.

"The only question was whether Morton got advice from Dr. Charles T. Jackson, the chemist, which entitled that gentleman to a share, greater or less, in the merit of the discovery.

"Later it was questioned whether he did not owe his first hint to Dr. Horace Wells, of Hartford, which need not be disputed. Both these gentlemen deserve 'honorable mention" in connection with the discovery, but I have never a moment hesitated in awarding the essential credit of the great achievement to Dr. Morton.

"This priceless gift to humanity went forth from the operating theater of the Massachusetts General Hospital and the man to whom the world owes it is Dr. William Thomas Green Morton.

"Experiments have been made with other substances besides sulphuric ether, for the production of anæsthesia

Among them, by far the most important, is chloroform, the use of which was introduced by Sir James Y. Simpson. For this and for the employment of anæsthetics in midwifery he should have all due credit, but his attempt to appropriate the glory of making the great and immortal discovery, as revealed in his contribution to the eighth edition of the 'Encyclopedia Britannica,' is unworthy of a man of his highly respectable position. In the ninth edition of the same work his article 'Chloroform' is omitted, and a fair enough account of the discovery is given under the title 'Anæsthesia.'

"Yours very truly,

"O. W. HOLMES.

P. S.—"You had better apply to Dr. Richard M. Hodges for his recent paper on the subject if you have not seen it already. I am yours, very truly,

WILLIAM J. MORTON, M. D.

"NEW YORK CITY, December 15, 1894."

William Thomas Green Morton, M. D., medical student, dentist and physician, and the recent recipient of Massachusetts' honor, was born in Charlton, Mass., August 9, 1819, and died, aged 48, in New York City, July 15, 1868.*

In 1840, at the age of 21, he was a student in the "Baltimore College of Dental Surgery," a chartered organization connected with the Washington University of Medicine of Baltimore.

Subsequently he engaged in the practice of dentistry in Boston, in the meantime assiduously pursuing his studies to receive a medical degree.

March 20, 1844, he entered his name as a student of medicine with Dr. Charles T. Jackson, of Boston.

In November 1844, he entered the Harvard Medical School in Boston in regular course as a matriculate and attended all the lectures.

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*See the American Cyclopædia: New York, D. Appleton & Co., 1875. Article, "Morton, W. T. G.," p. 585. See Encyclopædia Britannica, Ninth Edition, Article, "Anæsthesia." See the Century Illustrated Monthly Magazine, New York City, August, 1894.

In 1852 he received the honorary degree of Doctor of Medicine from his original alma mater, the Washington University of Medicine (afterward merged into the College of Physicians and Surgeons), of Baltimore, Md.

On September 30, 1846, at his office in Boston, he administered ether to a patient at the hospital, and Dr. Warren performed a severe surgical operation, the patient remaining unconscious during the operation.

He was now 27 years of age, and still a medical student in the Harvard Medical School. The discovery now announced, brought with it overwhelming labors, and he was compelled to discontinue his studies from that moment onward.

From this crucial demonstration in October, 1846, dates the immadiate and universal adoption of the practice of anæsthesia throughout the civilized world. The event marked the advent of a new epoch in the world's history, namely, the epoch of practical painless surgery.

Over Dr. Morton's grave in Mount Auburn Cemetery, near Boston, a monnment has been "erected by citizens of Boston," including names the most respected and honored among them, bearing the following inscription, written by the late Dr. Jacob Bigelow, of Boston:

"WILLIAM T. G. MORTON,
Inventor and Revealer of Anæsthetic Inhalation.
By Whom Pain in Surgery was Averted and
Annulled.
Before Whom, in All Time, Surgery was Agony.
Since Whom Science has Control of Pain."

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Mind your business and your business will mind you.

Why be a barnacle? Be the ship. There may be a use for a barnacle, but it is generally a nuisance. Better be a noble ship. You can have your choice, and there is a big difference.

# THE UNIVERSALITY OF LIFE.

What is that vital force which resists chemical affinity? How can the living be derived from that which is not living? Nature is universally living. That ever present action which we have seen to be in vegetable and animal, is it not found as truly in that majestic universe of stars, of worlds, planets and constellations, the very thought of which staggers one with its magnitude? In the first volume of "Cosmos" appears the following passage: "If we imagine, as in a vision of fancy, the acuteness of our senses, sharpened even to the extreme limit of telescopic vision, and incidents which are separated by vast intervals of time compressed into a day or an hour, everything like rest in spacial existence will forthwith disappear. We shall find the innumerable host of the fixed stars, commoved in groups in different directions, nebulæ drawing hither and thither, like cosmic clouds; our milky way breaking up in particular parts, and its veil rent. Motion in every part of the vault of heaven, as on the surface of the earth in the germinating, leaf-pushing, flower-unfolding organisms of its vegetable covering."

Life is limitless and boundless, and an absolute singleness of aim and unity of means is found everywhere. What we have been calling life—is it life? We have been dealing with manifestations. Are these doings then life itself, or simply those evidences which are capable of perception by our senses, and whose perception and interpretation depend upon the action of our limited, imperfect organs and reasoning faculties? Back of it all there still is the unknown, unknowable essence; the real, the *spiritual* life, or call it what you will. You must go back of the "Correlation of Forces" to the cause of that correlated force. Physical nature is but an appearance of that true nature which is more than it; and the more deeply it is studied, the stronger grows the conception of an acting, regulating power resident in it.

### THE SPIRITUAL LIFE.

Life only seems to be mechanical. Our higher instincts, our loftier feelings, demand of us to rise above the physical. We may still maintain the trustworthiness of our deepest sentiments, and the authority of our native instincts. Does not the evidence justify the assumption of an all-wise Creator, harmony with whose laws means peace, and deviation from which means discord and trouble? What fact is revealed to us by this scene of mingled life and death, of order and ruin, of life springing out of death, ruling decay and embracing ruin as its instrument? The loss of each thing is for the gain of each other; life perishing that life may be; dying, but in that death most truly living. What fact does this image; this life raised up from death, bestowed by death, and perfected by it? Of these things nature speaks to *us*, and points us to her Maker.—*Extract, Lane Lecture by H. E. Sanderson, Ph. D., M. D.*

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Some have said: "We cannot have inflammation of the dentine, because the dentine has no circulation." But the dentine is a living tissue, and all living tissue requires constant nourishment, and is constantly giving off waste products.

How is the dentine nourished, and what becomes of its waste products? As yet I have been unable to determine. According to Townsend and others, "We know that the largest of the tubuli are far too small to admit the blood corpuscles, but there is no reason why the blood plasma, or some fluid having like properties, should not enter the tubuli, supply the structure with the necessary nourishment, gather up the waste products, and pass out, by which a circulation is established in each tubule directly connected with that of the pulp."

If this be true, it is easy to explain why it is that we find the dentine of a tooth in which the pulp has, from any cause, become inflamed so fearfully sensitive. If the pulp be treated and restored to its normal condition the sensibility of the dentine is reduced. As to whether either of the terms, inflammation or hypersensitiveness of the dentine, are scientifically correct I have my doubts; of the two, I prefer the latter.—*Dr. W. H. Van Deman, in Register.*

## THE NEW GAS "ARGON" AND ITS DISCOVERY.

Sir Robert S. Ball, the distinguished scientist and fellow of the Royal Society, has contributed to the last issue of the London *Graphic* some very interesting observations on "Argon," the newly discovered fifth gas. He regards this discovery, which Lord Rayleigh and Professor Ramsay announced to the Royal Society on January 31 last, as one of the most important contributions of the century to our knowledge of the constitution of natural objects. Attention has already been called to the discovery in this city at a recent meeting at Johns Hopkins University. Among other things Sir Robert Ball says:

"The discovery, which at this moment rivets the astonishment of the world, is of a totally different description from such a feat as the addition of a new and rare metal to the already long list of such substances. In the first place, this new substance is not a metal at all, it is a gas; so that now for the first time since the science of modern chemistry has arisen, we have brought before us the detection of a totally new gaseous element. The significance of the achievement in this aspect will be at once appreciated, when it is remembered that only the four elementary gases, oxygen, hydrogen, nitrogen and chlorine, were previously known to exist. Many a philosopher would probably have said that the addition of a fifth gas to the list would be a circumstance almost inconceivable, and yet, to the astonishment of everyone, it has now been demonstrated not only that there is a fifth gas, but that this new gas exists in abundance in nature.

### WE ALL BREATHE IT.

"Argon is everywhere present around us, for it forms about the 250th part of the air we breathe. Every room of moderate dimensions contains this substance in pounds weight. There is nearly an ounce of argon in the air which presses on every square inch on the surface of the globe. We inhale argon at every respiration. Fifty pounds weight of it enters our lungs each year, so that in the course of a long life a man will actually have inspired and expired over a ton of a material whose very existence lay utterly undreamt of, until the splendid discovery by Lord Rayleigh, and Professor Ramsay has just announced its existence to the world.

"It will at once be asked, How can it have been possible that a substance so abundant can have hitherto escaped the careful researches of chemists? This is due to the circumstance that the element possesses a quality which gives it a wholly peculiar position among all the other constituents of the universe, so far as we know them.

### A BACHELOR ELEMENT.

"Every element, whether it be a metal or a metalloid, will, under certain circumstances, enter into alliance with other elements, and not unfrequently these alliances lead to such a close embrace that it is only by the application of powerful methods that we can effect a separation. Sometimes, however, the substances are more coy about contracting alliances, and when induced to enter into them, hold the bond so lightly that it can be ruptured without much difficulty. Among the older known substances, there was no one which invariably retained its bachelorhood, by refusing to unite with a suitable mate under conditions sufficiently alluring.

"The extraordinary circumstances about this new substance, 'argon,' which has just been brought to light, is that, so far as is known, it sturdily refuses to enter into any alliance whatever. Here, at once, argon stands out as a wholly unique object. It claims for itself a position in a class distinct from all the other elements hitherto known. Though lurking in the atmosphere in no small quantities, it had, by refusing all alliances, hitherto escaped detection. A splendid discovery, which has made the closing years of the nineteenth century famous in science, has now revealed it."

### HOW ARGON WAS DISCOVERED.

The presence of argon in the air was suspected by Lord Rayleigh because he had found that nitrogen obtained from chemical compounds was about half per cent. lighter than atmospheric nitrogen. After a long series of tedious experiments, Lord Rayleigh and Professor Ramsay succeeded in separating the new gas from the other component parts of the atmosphere, and were able to show their audience at the last meeting of the Royal Society a glass vessel filled with the gas. The separation of the unknown constituent was effected by two different methods—absorption of nitrogen by red-hot magnesium, and a repetition of the experiment in which Cavendish removed the nitrogen by electric sparking in presence of excess of oxygen and an alkali. Negative experiments were also made showing that chemical nitrogen, when treated by the same process, does not yield a residue of argon, or yields a residue so small as to be accounted for by accidental leakage of atmospheric air or absorption from the water used in the operation. In addition to these experiments recourse was had to Graham's method of atmolysis, or filtration of air through a porous medium.—*American Journal of Dental Science.*

# NITROUS OXIDE GAS.*

## REPLY TO AN EDITORIAL, BY DR. R. Q. COLTON, NEW YORK, AND THE EDITOR'S REPLY.

*Editor of the Dental and Surgical Microcosm:*

In your January number there appears an editorial article making a violent attack on nitrous oxide gas as an anaesthetic, which is as full of errors as an egg is of meat.

The *premises* from which you draw your conclusions are entirely erroneous, as I will endeavor to show.

You state, "Therefore, nitrous oxide will neither support combustion nor sustain either vegetable or animal life." Again you say, "We can produce asphyxia and death just as soon and no sooner with nitrogen gas, or carbonic acid gas, or olefiant gas, as with nitrous oxide gas." Not a supporter of combustion! On the contrary, next to pure oxygen, it is the most powerful supporter of combustion in nature.

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*Republished from DENTAL AND SURGICAL MICROCOSM, Vol. 2, No. 1, by special request in view of the recent effort to popularize this gas.

I presume you will agree in the statement that any gas that supports a flame (combustion) supports life; any gas that extinguishes a flame will extinguish life. Now strike a match and thrust it into a jar of nitrous oxide gas, and the combustion is intense. Light it again, and thrust it into a jar containing carbonic acid gas, and it is instantly extinguished.

Go to any dentist that makes a pure article of nitrous oxide gas, and ask him to allow a little stream to flow out. Light a match and let it burn till a live coal appears on the end, then blow out the flame and put the live coal into the little stream of gas, and the combustion is so intense that it bursts it again into a flame. Yet you tell us that nitrious oxide gas is not a supporter of combustion.

[MY DEAR DOCTOR:—Do you not recognize the fact that when you apply the nitrous oxide gas to a piece of heated charcoal, or a lighted match to the gas that you apply sufficient heat to decompose the two chemical elements and set the oxygen free, and that it is the oxygen set free that supports the combustion and not the nitrous oxide gas? There is not sufficient heat in an animal or a vegetable to decompose the chemical combination, and hence, it cannot support combustion nor sustain life.—ED.]

You say that when the nitrous oxide is administered for the purpose of producing anæsthesia, the oxygen is not absorbed by the blood in the lungs, and therefore the effect is to produce asphyxia. We all agree that asphyxia results from cutting off the necessary supply of oxygen to the lungs.

Now, the ablest work on anæsthetics I have seen was written some years ago by Prof. Ziegler, of Philadelphia. The Professor treats of chloroform, ether, nitrous oxide, etc. In view of the danger of producing asphyxia in the administration of chloroform, he says, it should never be administered unless you have some nitrous oxide present to *restore the patient* in case asphyxia is threatened. What! give a gas that produces asphyxia to restore a patient 'threatened with asphyxia! The only way to restore a patient threatened with asphyxia, is to supply oxygen to the lungs as quick as possible. The nitrous oxide does it quicker than atmospheric air, because it contains a larger portion of oxygen. And yet you say the oxygen in the gas is not absorbed by the blood in the lungs.

[Did anybody ever know of any patient being resuscitated from an asphyxiated condition by the administration of nitrous oxide gas? If small animals cannot live longer—on an average—than one minute and twenty seconds in an atmosphere of nitrous oxide gas, which has been abundantly demonstrated by the New York Medical Society, the Medico-Chirurgical Society of England, the Buffalo Dental Society, and by myself on various occasions; then in the name of *common sense*, how can it resuscitate an asphyxiated patient? This simply shows how little Prof. Ziegler knows of what he was assuming to teach others. He most manifestly either did not understand the nature and properties of nitrous oxide gas, or what physical condition properly constitutes asphyxia and the cause of it, or both.—ED.]

When Mrs. Peter Cooper was dying she had not sufficient vitality to draw enough air into the lungs to supply the necessary quantity of oxygen, and was gasping in great distress. The friends rushed over to Prof. R. Ogden Doremus, the distinguished chemist, of the New York College, to get some oxygen to throw into the room. Prof. Doremus told them it was not oxygen they wanted, for it would not be absorbed by the blood or but slightly. "What you want," said he, "is the nitrous oxide gas, for that is readily absorbed by the lungs." They then went to my office, got up the janitor (it was night) and drew off 180 gallons of gas in large India rubber bags. The whole of this was pressed out into the room of Mrs. Cooper. Ex-Mayor Hewitt, Mrs. Cooper's son-in-law, called on me the next day, and said the gas had afforded immediate relief, that all gasping was stopped and Mrs. Cooper was rendered comfortable during her last hours, and this was apparent to every one present.

And now, my good sir, was not the oxygen in the gas absorbed by the lungs in this case? How otherwise can we explain the relief afforded?

[This remarkable phenomena of Mrs. Peter Cooper in her dying hours not having sufficient vitality to breathe and gasping in great distress, has been witnessed again and again by more than a hundred thousand physicians and dentists all over the world, of women in distress and mental agony. Anything to soothe the mind and inspire hope! Even though it be nitrous oxide, which can by its administration only rob the blood of the *force* of *life* (free oxygen), which should be received with the atmosphere. No wonder that the "ex-mayor" said that the gas had afforded immediate *relief*—that all gasping stopped, for life itself soon took its leave. If the lady had been permitted to breathe pure atmospheric air, she might be living still. But what a sad comment upon the distinguished Prof. R. Ogden Doremus! *Distinguished* for what? His lack of knowledge of chemistry and its fundamental laws. Not oxygen wanted, but *nitrous oxide;* not *life*, but death; and death came with all its quieting effects, as it did to Bernard Mohan, of Pittsburgh, recently, from the use of nitrous oxide gas, and to many others, not only in this country, but in Europe.—Ed.]

You say, "In nitrous oxide we have no *free oxygen*, nor even oxygen." These are your words. The atmospheric air is composed (in round numbers) of four parts of nitrogen and one of oxygen. In this gas we have (by volume) two parts of nitrogen and one of oxygen, *not* one part oxygen and two of nitrogen, as you state. [This sentence is yours *verbatim*, but again we are too stupid to comprehend.—Ed.] In atomic proportions the parts are just equal. You deny that the gas can produce anæsthesia simply because the blood in the lungs will not absorb it, and therefore, like chloroform, it produces asphyxia. How long will a man live if his breath is nothing but nitrogen gas, or carbonic acid gas? Just as long and no longer than he would if his head were thrust under water.

[Here again, you are in error, as we have demonstrated by practical application that animals will live more than five times as long under water as they will in an atmosphere of nitrous oxide gas, nitrogen gas, carbonic acid gas, or olefiant gas. Why will they live so much longer? Simply, because, when in the gas the gas enters not only the lungs, but the blood. When in the blood (no two elements occupy the same space at the same time) it causes the oxygen to be eliminated so much more rapidly. But when in the water, true the water gets into the lungs, but it does not enter the blood, and the oxygen remains so much longer to support combustion and sustain life.—Ed.]

When traveling in Europe, Dr. J. Marian Sims requested me to give the gas for the removal of a cancer from the breast. He invited Baron Lang, the chief surgeon of the French army, and a number of leading surgeons of the hospitals of Paris, to witness the operation. I kept the lady asleep sixteen minutes, and till the operation was completed. When she awoke she appeared as fresh as before taking the gas. She stated that she had experienced no pain at all. All present expressed themselves surprised and pleased with the operation. I have twice kept a patient asleep forty-five minutes.

[We freely admit that asphyxia may be maintained a considerable length of time by admitting enough, and just enough, atmospheric air to sustain life, after asphyxia is obtained, but it may be said *truthfully* that when that is done the patient is held right on the death line, and that if you happen to carry the patient over that line your patient is gone, and all the powers of earth can't save. I care not to travel on that line. Others more reckless and venturesome may. Nor is it any evidence that nitrous oxide does not produce asphyxia, or that it supports life, that it may have been administered to tens of thousands without causing death.—Ed.]

When a surgeon commences to give chloroform to a patient for an operation, the circulation of the blood is partially arrested, and when a state of insensibility is reached, the heart-beats are not over twenty or twenty-five in a minute, and this simply because the usual supply of oxygen is cut off from the lungs.

Now when we administer nitrous oxide the pulse begins to *go up* instead of down, and this simply because we supply oxygen more rapidly to the lungs than is supplied by the air, and when the patient reaches a profound anæsthetic sleep the pulse is *fuller*, *stronger* and *faster* by from fifteen to twenty beats in a minute than when breathing the common air. How do you account for this fact? You say the oxygen in gas is not absorbed by the lungs. If it were not, the effect on the circulation would be the same as with chloroform. With chloroform some air *must* be admitted, or the patient is killed at once. The nitrous oxide is administered with *no* admission of common air, before the anæsthetic condition is reached. You state that patients under the influence of nitrous oxide turn pale. It is true: but why? Is it because the blood stops circulating, as in ordinary cases of sudden paleness? No. It is because the circulation is *suddenly increased.* If you were to run a block or two rapidly, or if you were to run up three or four flights of stairs, you look pale at the top. By the muscular action you have started the blood into quick circulation. It always starts from the heart, and is thrown into the arteries and drawn from the surface: hence the paleness. Stand at the top of the stairs for a minute or two, till the blood, in returning to the heart, passes through the little capillary vessels, and you have more color than before you started. It is just so in the administration of nitrous oxide gas. By the extra supply of oxygen, the blood in the lungs is prepared more rapidly for circulation. It is thrown into the arteries and drawn from the surface: hence the paleness. A moment or two after the operation is completed, the patient has more color than before inhaling it.

You speak of blueness in the face. This is sometimes seen, though seldom. What is the reason of this? We have started the blood into quick circulation, and thrown it into the arteries. In returning to the heart it has to pass through the little capillary vessels: these vessels have not got accustomed to deliver it as fast as received, and there is a slight engorgement, a damming up. In fifteen seconds, when we commence operations, it all disappears. Now, if it were *general* congestion, it would not as suddenly disappear. It is merely local, and confined to these small capillary vessels.

[Here again we must remind you that you fail to recognize the true cause of the results to which you refer. It must be evident to any one who properly thinks, that when the pulse weakens or grows less frequent, the force that moves the muscles of the heart must be diminished. Then whence cometh that force? It will not answer to say that life is that force. Life is not force; neither is force *life*. But *force* may make *life* manifest. The muscles have no force in and of themselves. They are only mechanical. The force that moves any organ may properly be called electric force. This animo-electricity generated from the basic element oxygen by the cerebral glands of the brain, must pass out from the brain—the great heart of the nervous system—into all the motor nerves of any and all the organs of the body in normal quantity, to enable any or all of the organs to perform their functions normally. Also, it must return to the brain—the great galvanic battery of the animal motor—in normal quantity in order that these organs of sensation may perform their functions normally. Any change in the flow of this animo-electricity will change the functions of these organs. Hence, arterial and venous circulation is dependent on neural circulation. But neural circulation in any motor nerve or set of nerves is dependent to a greater or less extent upon the action of the mind. The mind may be designated the governor of this electric battery. This spirit force operates upon material force and thus moves matter. Just how it operates upon certain cells of the brain to send out the electricity into the precise nerve, or nerves that are used to move certain organs, we may not be able to comprehend. But the fact that it does operate thus to produce these desired results is nevertheless true. To illustrate—the mind conceives of a tune; it is brought to bear (by that attribute that we call the will) upon certain cells of this brain or battery, to send out the animo-electricity into the nerves to make manifest the force necessary to move the desired organs to perform their functions, and thus spirit force operating upon and through material force moves matter—the physical man—to the piano stool and to the execution of this tune at the impulse of the will sending the electric current into the precise motor nerves that are wont to move the precise finger or fingers necessary to execute the tune, and the evidence of this execution is brought back to the mind (and only can be thus brought back) by the circulation of this same electricity in the sensory nerves to the brain and mind. This is not simply theory but recognized facts. Hence, we need not dwell upon the well-known fact that the action of the mind will and does influence and control the functions of any and all organs of the body. That during mental excitement or agony the pulse is more frequent and forcible, except in asphyxia, when it is weaker and less frequent—in consequence of the loss of oxygen to the blood and brain; or in case of paralysis or partial paralysis, as in syncope, or by *concussion* produced either by the sudden action of the mind, or by an external agent—chemical or mechanical. Therefore, you are again in error when you say that "in producing anæsthesia with chloroform the heart-beats are not over twenty or twenty-five in a minute." You should recognize the fact that in this condition you have robbed the blood of necessary quantity of oxygen to support combustion and sustain life, and that, in point of fact, you do not have anæsthesia, but asphyxia, nor have you administered an anæsthetic. There can be no true anæsthetic without having sufficient free oxygen as the all-important element to sustain life. Chloroform or any other suitable narcotic cannot of itself produce anæsthesia. There absolutely must be sufficient air to supply in due quantum the red corpuscles of the blood, out of which, as the basic element, sufficient electricity is generated to enable the vital organs to perform their functions *normally*, or nearly so. Hence, you should recognize also the true cause of the increase of the pulse in the first stages of administration of nitrous oxide. Your patient is excited mentally. Super-add to that the fact that you are depriving your patient of the necessary element—free oxygen—to sustain life, and that inherent nature demands it, and that your patient is in physical and mental agony to obtain it. Is it possible that you, or any one else, could expect anything else than a quick and forcible pulse in your patients in this condition? If you placed your patients under the water you would have a similar pulse during the same time. But you are unquestionably mistaken, or miss-state, when you say of nitrous oxide, "When the patient reaches a profound anæsthetic (?) sleep, the pulse is fuller, stronger, and faster by from fifteen to twenty beats in a minute than when breathing the common air." We will submit to the intelligence of the reader who has administered, or seen administered, nitrous oxide to profound asphyxia as to whether you state the facts. Except in mental agony in an asphyxiated condition, the pulse is always weaker and less frequent. And this is true whether the asphyxia be caused by nitrous oxide gas, nitrogen gas, olefient gas, ether, chloroform, or anything else that does not contain sufficient air to supply the necessary free oxygen.—Ed.]

You say: "Nitrous oxide gas acts by suspending one of the most important organic processes, that of respiration."

[You have enclosed this with quotation marks and say, "you say." Where and when did I ever use such language? Nitrous oxide gas, or nitrogen gas, or any other gas may be breathed without suspending respiration (some more freely than others) until you may have reached that advanced state of asphyxia wherein there is not sufficient force to move these vital organs; but notwithstanding the respiration, there is an utter lack of supply of the essential elements to support combustion and sustain life. Again, to relieve of headache, it is only necessary to interrupt the neural current in the nerves of sensation leading from the region affected. This may be readily accomplished by robbing the blood of the free oxygen by the administration of this gas.

Again, your theory as to the cause of the pallor seen in the advanced state of asphyxia by the use of nitrous oxide gas is most manifestly fallacious, as will be seen in its application to syncope and mental excitement. If the purpleness caused by the administration of this gas is not always seen, it is because of the thickness and condition of the skin and the difficulty of the blood to come to the surface. The blood is always black, or nearly so, caused by deoxidation; and the pallor is not a clear, white pallor, as would be in syncope or paralysis, but a bluish pallor, which is due to the blackness of the blood, and is death-like in appearance, as a result of the death-like condition of the patient.—Ed.]

This gas was discovered by Priestly—but it was finally analyzed by Sir Humphrey Davy in 1799—and proved that it was respirable. In his large work on the subject, Sir Humphrey Davy states that he often breathed it himself to relieve a headache. What! breathe a gas which is not "respirable" to remove a headache.

The impression produced by your article on one not posted on the subject, is that the inhalation of this gas is injurious to health. Well, I gave the gas to Dr. Horace Wells, of Hartford, Conn., on the 11th of December, 1844, for the extraction of the first tooth ever drawn without pain. This was the discovery of *anæsthesia*. The honor of the discovery belongs to Dr. Wells; I never claimed it.

The first experiment made with ether was on the 30th of September, 1846. Dr. Gutherie, of Sag Harbor, discovered chloroform, and Prof. Simpson, of Edinburgh, was the first to apply it, in the latter part of 1847, killing his patient.

The gas injurious to health! I have breathed it, with brief intervals, ever since 1844, and it has added ten years to my life. For the past twenty-eight years I have breathed, on an average, twenty gallons a day. When in my office I breathe four or five deep inspirations, filling every air cell in my lungs to show patients how I wish them to commence, so that in the aggregate I breathe twenty gallons during the day. It keeps my lungs expanded and my blood thoroughly oxygenized and vitalized. No one puts down my age at over sixty, while many say fifty-five, though as a matter of fact I am in my *seventy-ninth year*, having been born February 7, 1814. If the inhalation of this gas were injurious to health, I ought to have been dead twenty years ago.

I do not like the cylinder gas, which nearly all dentists use. Dentists are not chemists, and do not know how to make the gas, and so they buy the gas which is condensed in cylinders. It has to be allowed to expand into a bag or gasometer in order to be breathed. It answers very well for the extraction of one or two teeth, but for even this you have to give a very large dose. A single dose of gas, *properly made*, will answer for the extraction of ten or fifteen teeth or stumps.

The gas does *not* produce asphyxia, it produces an over exhilaration of the nerves, and by this means momentarily suspends their normal function. It used to be called "exhilarating gas," a very good name for it, but how could it produce exhilaration if the lungs did not absorb it?

You state that the gas will not "sustain either vegetable or animal life." Well, who ever said it sustained "vegetable life"? A plant lives on carbonic acid gas, not oxygen.

*New York, April 13, 1892.* G. O. COLTON.

[Nitrous oxide injurious to health! Most *assuredly* it is. If depriving of the life-sustaining element is injurious to health and does violence to the nervous and physical constitution, then the administration of nitrous oxide most certainly produces these sad results, and, in the language of the English savant, Dr. Richardson, "Its use for the pretended purpose of producing anæsthesia should be prohibited by law." You say that by frequently taking this gas your life has been extended ten years. What authority have you for so saying? Might you not, with more than equal authority and evidence, say that if you had not been taking nitrous oxide gas that you might have lived more than a hundred years? Why not? You are of good Puritan stock, and reputed to be a man of good, temperate habits. Then why not live a hundred or more years if you had not been using this asphyxiating gas? Really, Doctor, does not your attempt to controvert the *uncontrovertible arguments* of the editorial to which you refer consist largely of such hypothetical statements, telling what you have done with and for nitrous oxide, and what nitrous oxide has done for you? This may be all very well, and in perfect harmony with your efforts to popularize nitrous oxide gas, out of which you may have amassed great wealth. Yet such sophistry will not answer to establish the true character, properties and effects of nitrous oxide gas in its relation to the science of anæsthesia. When no animal, or plant, can live any length of time in nitrous oxide gas, that at once settles the question as to its ability to produce anæsthesia. A plant cannot live without free oxygen, any more than can an animal. It is also true that a plant will die in an atmosphere of carbonic acid gas as soon as it will in nitrous oxide gas, and no sooner. This we have also demonstrated by actual test: Carbon is food for the plant, but carbonic acid gas will not of itself sustain the life.—Ed.]

## ELECTRITY NOT STOLEN.

"Yes, I am glad they have the trolley," said a Broadway merchant to a reporter of the Brooklyn *Eagle*. "It gives us rapid transit and it saves me a lot of money. Last year I paid out quite a sum to keep cool. This season it won't cost me anything."

"How is that?" asked the reporter.

"Well," said the merchant, "I don't know as I ought to tell you newspaper fellows, for if the thing gets into the papers I may lose the 'cinch' I have now. However, it is something everyone ought to know, so here goes."

"You see that air cooler," continued the merchant as he pointed to a rapidly revolving electric air fan. "Well, it don't cost me a cent to run that. You might say I steal the electricity, but then you know I wouldn't do that. You see the entire street in front of my store, and, in fact, in front of all the stores where the trolley runs, is saturated with electricity. Now I, like several others, have taken advantage of this condition of affairs. One of the wires from that electric fan runs down to the gas pipe in my cellar. The other is attached to the water pipe, and here I have the negative and positive poles, and, of course, the circuit is formed. You can see for yourself that the current is sufficient to send the motor of the electric fan around at a lively rate. Now, that motor is a 1-12-horse power, but I am sure the current is strong enough to run a 3 or 4-horse power motor. But, then, that doesn't bother me, for I'm not in the manufacturing business, and all I want to use the electricity for at present is to keep cool this summer. I may, however, run a sewing machine with the current. Yes, the trolley is a great thing and I am glad the people of Brooklyn have got it."

The reporter traced the wires from the electric fan to the cellar and found that they were attached, as stated, to the gas and water pipes respectively. The reporter also discovered that the waste electricity is being utilized in a couple of saloons and in a jewelry store. In every case the wires are simply attached to the gas and water pipes.

"If I wanted to," said the man, "I could run machinery that requires 4 or 5-horse power. All I would have to do would be to drive a couple of gas pipes right up within a few inches of the track and I would be able to get all the power I needed. It wouldn't be stealing the electricity, either, you know."—*N. Y. Exchange.*

## THE IMPROVED GENERATOR.

The *Licensees* of the "*Hayes Process of Anæsthesia*" will note that the latest *Improved Generator* is all that can possibly be desired in its neatness, perfection in construction, and in its adaptability to the *Process.*

The construction is such that, instead of the door as formerly, the top or cap of the Generator is made to be removed, the narcotic chamber of glass is secured to its lid or cover, which has the screw faucets with their respective tubes leading into the narcotic chamber; and the sheath, with index, dial and cap for the Generator, all combined in one piece, which lifts out of the shell of the Generator to be charged with the narcotic liquid by means of a small funnel.

When properly charged with the narcotic liquid (about half full) it is replaced with perfect ease.

The screw faucets are manipulated from the top of the Generator, as is the index on the dial and the shield. The shield contains a double slot, whereby the percentage of the narcotic or the atmosphere is regulated by the turning of the knob to which the index is attached.

When about to administer the anæsthetic, the knobs attached to the screw faucets should be turned four times around from right to left that the air and narcotic vapor may pass freely through the tubes. If this is not done, or if only one is thus turned, the results will not be attained.

The index should always be placed at 1 on the dial, when beginning, and then turned as per directions in the Book of Instructions. Of course all other instructions contained in the "Book of Instructions" should be followed in every particular.

We have labored for years to obtain an instrument that would be perfect in its adaptation to the work in all respects. One of the great difficulties has been to obtain a Narcotic Chamber with the attachments necessary to generate and regulate the anæsthetic without having some leakage. This, we are pleased to state, has been entirely overcome, and we think that when it is seen it will be highly appreciated. While it has cost our company a great deal to secure these desired results, it will save in material alone to the dentist in a short time more than the extra cost; besides it is so much more effective and beautiful.

HAYES DENTAL & SURGICAL M'F'G CO.

Be thankful for troubles and disappointments and losses and crosses; they are often the best things could happen. To have our own way uninterruptedly would be the worst thing that could happen; we would surely be spoiled. How often children are spoiled in this way, and we are but children of larger growth. The best of men have their rebuffs, and humiliations and defeats; it is largely their victories over these that give them strength and wisdom and power.

## COMMENT BY WIKSELL.

[For Dental and Surgical Microcosm.]

BOSTON, April 1, 1895.

TO THE DENTISTS AND SURGEONS OF MASSACHUSETTS:—Anæsthetics in the hands of surgeons of the past 40 years have been like a vast engine of good without a throttle. The immense gulf between Franklyn's kite string and the Edison lamp is no greater than the difference between the usual methods of giving anæsthetics and the Hayes Process.

No surgeon has ever claimed that he knew the amount of any given anæsthetic and the proportion of air he administered in any given case.

With the Hayes method we can produce any degree of anæsthesia from the numbness in which we can cut sensitive dentive to the profound and prolonged sleep for surgical operation—without for a moment interrupting the functions of life.

I invite all who are interested either as dentists or surgeons to call and examine the Hayes Process of and Apparatus for Generating and Applying Anæsthetics, etc., and see practical demonstration of its use.

GUSTAVE P. WIKSELL, D. D. S.
310 Hotel Pelmam, Boston, Mass.

P. S. I regard it as almost criminal for a dentist to continue to cause the awful pain of excavating and burning sensitive dentine when this absolute method is placed before him.

## WORDS FROM LICENSEES OF THE HAYES PROCESS OF ANÆSTHESIA.

Dr. M. R. Thompson, Lewiston, Pa., writes: Yours of 3d inst. at hand containing Book of Instructions on the Hayes Process, etc., with a request to answer how I am getting along with the Hypnotic, etc. I would say in reply that I am getting along splendidly. I use it nearly every day and many days on different patients, and am always successful.

Indeed, I had one case of a little girl of four years that had just got over a long spell of pneumonia. One lung was entirely gone and pus ran out where the Doctor opened between the ribs. She had two lower molars to take out and her Doctor told the mother she was too delicate to stand the shock. The Doctor and mother bundled her up and brought her to my office and explained the case to me. I then put the Doctor at the left of the little patient with his ear on her breast to hear the heart action, and conducted the anæsthesia. She went promptly under it. I took out the two molars, picked the little one up and lay her on her side on the lounge, that the blood might run out. In a short time, she opened her eyes and laughed, as though she was waking out of a sleep.

I have now administered the Hypnotic to about 500 patients. I keep a record and know just what I am doing. Many come in who claim they have heart disease. I put them in the chair, look the patient in the face and talk to them till I gain their confidence; tell them to breathe as I do and along with me, and that they can't die breathing. I then proceed and I have not had one failure. I certainly have had some very timid ladies, but have "got there" every time.

I sometimes use the A. C. E. mixture, but I think the Hypnotic is the best. I have made a study of anæsthetics for many years, and have administered gas, ether, and sometimes chloroform.

Dr. Geo. F. Tucker, Dalles, Oregon, says: Enclosed find draft on New York for ten dollars. Please send, securely packed, at your earliest convenience, ⅓ doz. bottles Hypnotic. I have administered the aerated Hypnotic to eighty patients, and am now convinced that it has all the *desirable* properties of the other anæsthetics without their dangerous and disagreeable features.

Dr. C. H. Alexander, of Middlesborough, Ky., writes:—I have used Hayes' Process of Anæsthesia extensively, and have had no trouble or sickness. The heart has had good action in every case. I have given it in the presence of the best M. D.'s in the city (Dr. Robison, Dr. Kurgan, and Dr. Card). They all pronounce it a perfect success, and for my part I am well pleased with it.

Dr. S. M. White, Benton Harbor, Mich., says:—I will say that the Hayes Process is a success. I have used it on nearly 2,000 patients of all classes. It holds the patient so there is no trouble to take out all the teeth that are to be extracted; have taken out 32 several times. It is very easy for patient to take.

I could not do business without it.

Dr. J. C. Duncan, Johnstown Pa., writes:—After an experience of several years in the use of the different anæsthetics, I purchased an office right to use Dr. Hayes' Process of Generating and Applying Anæsthetics. After using this process about three years, I was so well pleased with it that I purchased the exclusive right for Johnstown. I can heartily recommend it to both the dental and medical professions.

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Hayes' Apparatus and Process of Anæsthesia are far ahead of anything which I have ever used and is quite convenient to use. The results we have found to have been quite satisfactory and I certainly can recommend it to those who have any intention of quitting gas or procuring anything which is comparatively new, and will say that I used nitrous oxide for several years and honestly believe it is as nothing when compared to the Hayes' Process of Anæsthesia. Hoping this will meet with your approval, I am, Yours very truly,

J. W. Soule, Ottumwa, Ia.

Dr. Edward Pitwood, of Spokane, Wash., who paid $375 for Exclusive Dental Right License to the city, writes: Will say in regard to your Process that I am well pleased with it and knowing what I do about it, would give three times the price I paid before I would be without it.

E. J. Morgan, M. D., Oneonta, N. Y., says: "The Apparatus works very satisfactorily. I am writing a paper on Anæsthetics for our medical society, and if you have any additional facts more than you have sent us I would like to have them. I have used ether quite extensively for the past thirty years. I like the Hypnotic *first rate.*"

PROVIDENCE, R. I., Nov. 19, 1894.

*Dr. S. J. Hayes, Pres't Hayes Dent. and Surg. M'f'g Co.:*

DEAR SIR—I wish to thank you for administering your Anæsthetic to my patient at Warren on the 14th ult., and also to express my entire satisfaction with the action of the same. The patient was one to whom I feared to administer either chloroform or ether in the ordinary way, she having a fatty heart of extremely feeble and irregular action, besides being in a deplorably nervous condition, worn out by pain and suffering. Despite these untoward conditions, there was not the slightest ill effect from the anæsthetic as administered by your Process, and the patient's condition was better at the close of the operation than before. No nausea supervened and recovery took place in *less* than three minutes after its suspension, although she had been kept in a state of profound anæsthesia for a space of at least 25 minutes.

I have no hesitation in recommending your process of producing anæsthesia as the safest and most pleasing, both to physician and patient, of any that has been brought to my attention. Very respectfully,

W. J. SMITH, M. D., 810 Westminster St.

Dr. F. F. Farmer, of Noblesville, Ind., says: "I am happy to say in filling teeth, where extreme sensitiveness appears, it is the *ne plus ultra*—nothing equals it."

Drs. Edwards & Son, of Des Moines, Ia., having used this Process nearly three years, state: "We are *well* pleased with results and have *no* unpleasant effects. We are not at all afraid to give it to anyone."

J. H. Falks, D. D. S., Augusta, Ga., writes: "Words cannot express my kind feelings for you for the blessing you bestowed on me in getting me to take your Hayes' Process of Anæsthesia, and not only me but poor suffering humanity. I have had just splendid luck. I have done more than as much again right from the start."

## DISCOVERY OF ANÆSTHESIA.

The *British Medical Journal* for January 5, contains the following paragraph:

"A tablet of bronze to the memory of Dr. Horace Wells, of Hartford, Conn., was unveiled on December 11, 1894, in commemoration of the fiftieth anniversary of the discovery of nitrous oxide as an anæsthetic. On December 11, 1844, Dr. John M. Riggs, at Wells' request, administered nitrous oxide to him and extracted a tooth under the influence of the gas without causing him any pain. The tablet bears a medallion portrait of Horace Wells, the dentist, with the following inscription: 'To the memory of Horace Wells, who, upon this spot, December 11, 1844, submitted to a surgical operation, demonstrated and proclaimed the blessings of anæsthesia.'" We cannot help feeling that anything can only be discovered once, and that the one who has priority in publication is the one entitled to the discovery, and in *this* respect we still maintain that *Sir Humphrey Davey* was the discoverer of the anæsthetic properties of nitrous oxide, and *not* Horace Wells."

[If our worthy contemporary had used the word asphyxiating properties of nitrous oxide in his reference to the discovery by Sir Humphrey Davey, he undoubtedly would have told the truth, and not only have driven, but clinched the nail.—EDITOR.]

Do not brag too much of what you have been, or what you are going to be, but show by what you do what you are now.

Better be a reflection than nothing, but I would rather be a sun than a satellite. It is an advantage to have a light to follow, but it is better to be the light. What a cold bleak thing the moon is; but really what a warm genial inspiring world the sun is. How it makes things grow and laugh and bear fruit. There are suns among men, and there are barren moons. These latter have the face of a man, but not his winning love and genial, useful life. Which are you?

# THE DENTAL AND SURGICAL MICROCOSM.

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EDITORS:
S. J. HAYES, D. D. S., M. S. A. M. FRANCES HAYES, A. M.

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## DEFINITIONS.

Having respectfully requested in our January MICROCOSM the advocates of nitrous oxide gas as an anæsthetic to give us a clear, comprehensive definition for the words anæsthesia and asphyxia, each word describing or defining a physical condition radically different each from the other, and at the same time clearly distinguishing the one from the other, we have received several replies, but none from those who have figured so prominently in the celebration of the so-called discovery of Dr. Wells, as we had hoped.

The following is a sample of those submitted, and as it comes from the locality of earnest advocates of nitrous oxide, we give it verbatim:

PORTSMOUTH, N. H., February 6, 1895.

DR. HAYES—I have been a careful student in anæsthetics for thirty years, and I will venture to give a good, practical definition of anæsthesia and asphyxia, according to your request in the January number of the MICROCOSM, unless you shall receive a prior and a better one from Dr. Fillebrown or Dr. Thomas.

1. An anæsthetic is that which produces insensibility, or is capable of rendering insensible by being inhaled by means of any of the well-known anæsthetics—chloroform, ether, or nitrous oxide gas, which is not a narcotic, as it is capable of being inhaled, and narcotics are medicines taken in doses by prescriptions from M. D.'s. Being poisonous, they are irrespirable, and must be taken as medicines. Your question whether a club or electricity can be properly called an anæsthetic is wholly irrelevant. We might as well ask, can fainting be called an ansæthetic when a patient faints to total unconsciousness?

2. Asphyxia defined is simply pulseless, or no throb or beat of pulse; apparent death, or suspended animation, generally from suffocation or drowning, or the inhalation of irrespirable gases. No, you readily see we do not feel afraid of nitrous oxide gas, as regards asphyxiating a patient. We do not care to attend to the pulse; simply keep respiration normal and pure nitrous oxide gas can be administered twenty, thirty, or forty minutes easily and safely by intermitting a few inhalations of atmospheric air when stertorous breathing is resonant and jerky. I administered it for the surgical operation of rupture of the peritoneum, and kept the patient quiet and wholly anæsthetized for forty-five minutes, and consumed and wasted one hundred gallons of gas—no ether or chloroform, not one drop.

Gas has its limitations and weaknesses, and I would attack it on some other fact, but not at all on asphyxia, leaving to the anæsthetist a margin of good, common sense to introduce a proper amount of oxygen from the air when stertor comes on, and in prolonged anæsthesia. The rigidity of the muscles and fixedness of the lower jaw, together with heavily bearded men, where there is leakage of atmospheric air, usually defeat complete anæsthesia with nitrous oxide gas. Also with timid and nervous patients, the sense of suffocation, because they take short, spasmodic breaths, and are badly frightened.

Here will be enough and more than enough to satisfy any intelligent dentist that I have fairly and squarely tried to give accurate and normal definitions, as well as to show the proper way to dispose of nitrous oxide gas.

Yours truly,

E. B. GOODALL., D. D. S.

That Dr. Goodall is sincere and deserving of credit for his manifestation of interest in defining the words anæsthesia and asphyxia, we do not question. But he has evidently been misled by so-called authority and by previously conceived impressions, like many others, without critically investigating for himself as to the exact physical conditions and the words employed to distinguish these conditions. No intelligent man will attempt to deny that the desired physical condition for painless surgical operations is that in which the force and functions of life are in continuance under modifications whereby absensation is secured. Neither will he deny that the word anæsthesia, correctly defined, represents very clearly this precise physical condition. (See page 87, DENTAL AND SURGICAL MICROCOSM, 2d paragraph, Vol. IV., No. 2; also page 89, this issue.) Therefore, unless the force and functions of life have been sustained the patient is not in the anæsthetic state. If the pulse and functions of the heart have been suspended there is unquestionably the first stage of death. This may be caused by the deoxidation of the blood, the suspension of the *force* of *life* which is invariably the result in the use of nitrous oxide or any other inert gas without the admixture of free oxygen. The cessation of the functions of life may also be brought about by the sudden action of the mind, as by fright or by an over percentage of a powerful drug suddenly introduced, or by an over volume of electricity. But can it be claimed that because there may be absence of sensation, caused by these agents thus employed, the condition produced is the anæsthetic state, and that, consequently, these agents are themselves anæsthetics? Fainting is the result of the sudden action of the mind, or of exhaustion whereby the neural current is interrupted in the motor nerves leading to the vital organs. This produces a physical condition radically different from either anæsthesia or asphyxia, but the same as that produced by a club, or by an over volume of electricity, or by an over percentage of a powerful drug, or by an undue proportion of chloroform, ether, etc., in the atmosphere suddenly thrust into the lungs. Hence, it will be seen that the inhalation of what Dr. Goodall terms the "well-known anæsthetics," chloroform, ether, etc., do not always produce anæsthesia, nor are they true anæsthetics. A *true* anæsthetic must always have in it sufficient free oxygen (not oxygen chemically combined) to support combustion and sustain life, without which there absolutely and unquestionably can be no anæsthetic. Therefore, neither chloroform, ether, etc., nor nitrous oxide gas can be an anæsthetic. But any of these liquid narcotics, such as alcohol, chloroform, etc., may be a subordinate element in a true anæsthetic, while nitrous oxide cannot be even an element therein. If air be admitted, it prolongs the time when asphyxia supervenes. When such is the case, there is a greater constriction of the muscles; the jaw and the eyes are more firmly fixed. Hydrogen gas and chlorine gas will induce a condition of asphyxia more dangerous than either nitrous oxide or carbonic acid gas can in consequence of their greater specific gravity, being more difficult to remove from the air cells of the lungs by the inhalation of the atmosphere. In other words, the gases of greater specific gravity are more difficult to remove by the force of the atmospheric air, or of free oxygen. Hence, there is the greater danger to life. Especially is this apparent in the inhalation of chlorine gas, which is almost irrespirable because of its greater specific gravity. This being an element in chloroform, the vapor of the latter is less respirable in consequence than those of ether or chlorolene. By reason of this there is greater liability of not having a true anæsthetic, hence greater peril to life in the use of chloroform vapor from the excess of the drug in the narcotized air, or the absence of *free oxygen* in the anæsthetic vapor. A forced respiration in the use of chloroform narcotized air properly charged, or the use of pure oxygen gas charged with sufficient chloroform to narcotize the patient properly, and introduced gradually, beginning with about one per cent. of the chloroform in the anæsthetic, with a gradual increase as is done by the Hayes Process of and Apparatus for Generating and Applying Anæsthetics, is the only absolutely safe process whereby true anæsthesia is invariably produced without *peril* to life either from asphyxia, or from shock by the chemical and pathological effects of the chloroform, or from similar results of any other drug in the anæsthetic.

Dr. Goodall says: "Asphyxia defined is simply pulseless, no throb or beat of the pulse, apparent death, or suspended animation." A club, electricity, a sudden action of the mind as in fright or in fainting might produce this state described by the Doctor. Are these, as a consequence, asphyxiants? He further adds that this condition is "generally from suffocation, or drowning, or the inhalation of irrespirable gases." In all of these there is absence of free oxygen, for want of which asphyxia is always produced. But an animal will live four or five times as long under water as it will under a bell jar in nitrous oxide gas. This has been repeatedly demonstrated and as emphatically has it been shown that nitrous oxide gas will not support combustion or sustain life, either animal or vegetable. How, then, can it be an anæsthetic? If anæsthesia can only be produced by having (in the agent) administered enough free oxygen to sustain life, and if there be *no free oxygen* in nitrous oxide, *how* can this be a true anæsthetic?

In the face of this *reductio ad absurdum* will the zealous advocates of the anæsthetic properties of this gas continue to try to maintain their claim of anæsthesia being discovered by Dr. Horace Wells, of Hartford, Conn.? There are degrees or stages of asphyxia as well as of anæsthesia, or of hypnotism. That there is a degree of asphyxia in which the neural current of the sensory nerves may be interrupted to the extent of producing insensibility and may be maintained, possibly, for hours, by admitting to the lungs sufficient free oxygen, in the inhalation of atmospheric air, to enable the vital organs to perform their functions feebly, thus sustaining life at a low ebb, and the patient be resuscitated, we willingly admit. But it is assuming entirely too great a risk to hold the patient thus on the dividing line between life and death. There are men who can stand on the brink of the eternal gulf, and, ignorant of their peril, tremble not, though barely escaping the depths of the vortex. But we claim that no rational man, aware of the dangers of this condition, will voluntarily place himself here. Not to my knowledge has a human being or an animal been in an atmosphere of nitrous oxide gas—excluding free oxygen —more than three minutes and been resuscitated. In this gas the average duration of life in small animals under the bell jar, has been proved by numerous experiments to be one minute and twenty seconds. The blood taken from them immediately was found to be black. Thus is seen the necessity of Dr. Goodall's statement: "Intermitting with a few inhalations of atmospheric air when stertorous breathing is resonant and jerky." This stertorous breathing and nervous spasms are but the admonition of approaching death, or are rather the agonies of death and should *never* be permitted.

In view of these facts, the eminent Dr. Richardson says: "The use of nitrous oxide gas for the pretended purpose of producing anæsthesia should be prohibited by law."

## THE STATE MEETING.

We predict a large attendance at the Russel House, Detroit, on June 18, 19 and 20, 1895. No more appropriate location could have been selected for an enjoyable meeting of the dentists of Ohio, Indiana and Michigan. In view of the numerous and easily accessible resorts and frequent outings from this "City of the Straight," many attending this convention, no doubt, will take their wives and daughters, and remain several days after the meeting has adjourned, to enjoy the pleasures afforded by this occasion.

The clinics and scientific sessions will be held in the Dental Department of the Detroit College of Medicine and Surgery

# THE DENTAL DIGEST AND SYNDICATE.

Our worthy contemporary seems not to be in the ring, has not yet been brought into the syndicate of dental dealers, and, naturally enough appears to be a target at which the Dental Cosmos and other journals published by members of the syndicate are hurling their missles. As the Dental Protective Association did not meet with *vital* encouragement from the organs of the syndicate, it became quite necessary for this Association to have its own mouthpiece, its own medium of reaching members of the dental profession, and accordingly gave birth to the Dental Digest, which organ proposes to remind the dental profession at large of their own individual interests and of the dental syndicate combine against the personal interests of the profession. The Digest says (in an editorial): "In regard to nearly all the journals being controlled by dental supply houses or dependent on the advertisements from these houses for support, we beg leave to inform our friend that before he became Editor of the Cosmos nearly all the large supply houses entered into a trust. A dental trust was certainly not organized in the interests of the profession, and while, of course, no criticism could be looked for from the journals controlled by the combine, there were a few journals which would have taken the side of the dentists against the unlawful combination, but if they had done so the advertisements from the trust would have been withdrawn. We take the ground that there is a vast difference between a Dental Supply Co. composed of dentists, owned and controlled by dentists, organized on a coöperative basis for mutual benefit and in no violation of law, and a combination, or trust forced to keep the prices up, and so tax the profession. Can any one show why the journals which claim to represent the dental profession and to have its best interests at heart should not help? We await a reply."

Could our sage brother of the Digest expect even an ordinary animal to kick himself? Much less a syndicate of wise dental dealers. Evidently the eyes of our contemporary era not yet fully opened to all the strategy of this combination of dealers, or he would not so readily fall into the same snare or become *particeps* in the attempt to popularize and foist on the unsuspecting, nitrous oxide gas as an anæsthetic. Is not the cunning hand of this dental syndicate clearly seen in their securing the services of prominent men in the dental profession to do their bidding, no matter how menial the work may be? Does any one suppose for a moment that a dental supply house will supply the programs and publish the transactions of Dental Associations in pamphlet form without compensation either direct or indirect? How wily to put individuals and Associations under obligations by making presents that they may secure favors! Yet, how humiliating it is to be put under obligation to that which of itself is against the interests of the profession and dishonorable in itself. The question has been asked, who holds a *magna charta* on the American Dental Association, as well as on most of the other Dental Associations? The answer may be found in the *transactions* of the *Associations.* Do all dealers and exhibitors have equal privileges and favors conferred? Who will dare to question the motives, honesty, or *honor* of either the Dental Syndicate or their dupes? The handwriting on the wall may be read: "*Dr. Wells, the discoverer of Anæsthesia.*" But Priestly discovered nitrous oxide gas, and Sir Humphrey Davy submitted to the first surgical operation without pain, while being asphyxiated by nitrous oxide. "Yes, we know that, but Dr. Wells had the first tooth pulled without pain, while asphyxiated with nitrous oxide, and of course he discovered Anæsthesia."

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CHLORFORM—NARCOTIZED OXYGEN as an anæsthetic is being experimented with, and is attracting some attention among the scientifically inclined. We witnessed the administration by W. H. Cooper, M. D., at the Homœopathic Hospital, in Pittsburgh, in which case the subject was profoundly anæsthetized in six minutes for a severe and lengthy surgical operation by Dr. Williard.

While the blood was fully oxygenated, as was evident from the color of the lips and countenance of the patient in the later stage, yet the sudden introduction of an over percentage of the drug in the early stage of administration, was evident in the manner of breathing as well as in the pallor of the patient.

There can be no question as to the advisability of the use of more oxygen, especially in the latter stages of anæsthesia than is found in the narcotized air as usually administered. But in the use of the apparatus in the above case, excluding the atmospheric air in the first introduction of the anæsthetic, and having the oxygen charged to its full capacity at the high temperature in which it was administered, there is eminent danger of paralyzation of the nerve centre from the chemical and pathalogical effects from the excessive quantity of the drug thus suddenly introduced into the lungs, with its tens of thousands of nerve filaments, spread out over about 1400 square feet of surface, as is estimated to be in an ordinary-sized man's lungs. Those effects produced by reflex action upon the brain may cause paralysis of the inhibitory nerves leading into the muscles of the heart. This we regard as a very serious objection in the manner of making and introducing the anæsthetic, while the introduction of oxygen, especially in the latter stages of anæsthesia, in order to have the blood fully oxygenated and thus sustain life in normal condition as nearly as possible during the anæsthesia and surgical operation, is unquestionably what is needed. The Hayes Process of Anæsthesia provides for the oxygenation of the blood in the forced aeration and more than normal breathing, and by this process there is absolutely no danger from an over percentage of any drug, as the introduction is gradual and *free oxygen* is supplied in sufficient volume to sustain life normally in the early stage of anæsthesia. While in prolonged surgical operations it might be an advantage to introduce a small quantity of oxygen, that there never be the slightest tendency to asphyxia.

We were informed by the surgeons at the above hospital, that they had adminstered to about twenty-five patients with but very little nausea, or other unpleasant results.

SPREAD EAGLE ORATORY.—*The Dental Record*, of London, says of the speeches at our Memorial Anæsthesia meetings: "We are at times carried out of ourselves by the pictures drawn of the benefits accruing from the use of anæsthesia, and anon left floating in mid-air, wondering where we are, and what its (*sic.*) all about, and if it is not perilously near bathos." Making due allowance for the peculiar inverted passive figure, which represents us as being "carried out of ourselves," and for some eccentricities of grammar, we are inclined to think that the *Record* comes perilously near to the truth. Perhaps the circumstances of the occasion were an excuse for the employment of lurid rhetoric, if it is ever excusable, but there is truth in the intimation that we are too fond of pyrotechnical displays of language, and that this is too often mistaken for oratory.—*The Dental Practitioner and Advertiser.*

You are right, brother Barrett and *Dental Record.* But then, this occasion required an exceptional display of pyrotechnics, and you should not be too severe in your criticisms. Should you clip the feathers from the bird it cannot fly, and *fly it must.* Nitrous oxide is a beautiful bird, if you do not strip it of its feathers, and thus expose its corpus, and the source from whence it derives its support. If we are to receive this bird "we must be carried out of ourselves by the pictures drawn, and anon left floating in mid-air, wondering where we are and what its (*sic.*) all about, and if it is not perilously near bathos." Yes, this does really seem "perilously near the truth." But as you say, Doctor, "perhaps the circumstances of the occasion were an excuse for the employment of lurid rhetoric, if it ever be excusable." Yet, with all the *lurid rhetoric* and verbal pyrotechnics, the true character of this remarkable celebration, like that of the animal in the ancient fable, by its prodigious ears protruding from beneath the covering, stands out in full view of the scientific world. We cannot fail to recognize that the real object and aim of this demonstration was not especially to honor Dr. Wells (for how can any man be honored in misrepresentation?) but to create the impression that nitrous oxide is an anæsthetic, and not an asphyxiant, thereby popularizing this gas by this celebration.

The dental dealers, who publish the dental journals, advocating and aiding this demonstration, have made millions of dollars out of nitrous oxide and gas apparatus. Should we be at all surprised to find their special friends moving in the front ranks in this popularizing effort, with their "lurid rhetoric and pyrotechnical displays of language"? Surely the occasion requires something extraordinary.

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We send sample copies of this number of DENTAL AND SURGICAL MICROCOSM to all Licensees of the Hayes Process of Anæsthesia who are not subscribers, but will only send to those who are subscribers in the future. No Licensee can afford to do without the journal. Its teachings on the Art and Science of Anæsthesia, are of special value to those who are using this Process. Cut out the slip in front of this number and enclose your dollar with order. There is no other journal that will afford you as large returns for your money if you carefully read and practice. Don't postpone, and think I will next week, or some time in the future. Now is the time. Your subscription will help the good work along.

Besides, this journal, when bound, will be a ready book of reference, should you care to write on the subject of Anæsthesia. It is admitted to be the best source of information on this subject, to which it is chiefly devoted. In every issue there is at least one scientific article on Hypnotism or Hypnotic Anæsthesia, which is attracting the attention of medical and dental students all over the world at this time. Read the article in this number by Prof. Davis, of the School of Anæsthesia, of Chicago, or the one in last issue by Prof. W. R. Newbold, of the University of Pennsylvania, and you will be impressed with the character of these articles, as well as greatly benefited thereby.

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The exchanges and correspondents of THE DENTAL AND SURGICAL MICROCOSM will kindly note the change of address from 901 Penn avenue to 814 North Negley avenue, Pittsburgh, Pa.

We commend the very sensible views expressed in an editorial in the *Dental Practitioner* on the degrees thrust on the dental profession. The multiplicity of degrees, or forms of expressing the standard of education which should be attained and maintained only tend to the confusion and depreciation of the true and honorable standard that ought to exist. These freaks of the colleges which are foisted *ad libitum* on the profession and public, ought not to be tolerated. It is high time that the profession as a whole take proper steps to prevent this confusion.

## TO LICENSEES.

It is due to the *Licensees* of the *Hayes Process of Anæsthesia*, that we make known to them that in the *use* of Hayes Hypnotic up to date by this Process at our recent estimate of the amount consumed, estimating for dental operations and minor surgical operations an average of 75 patients to the lb., that at least about 400,000 patients have been anæsthetized and that in the use of Chlorolene on the same base about 125,000 patients have taken it, making a total of about 525,000 patients without causing a single death. Besides some of our Licensees have used Chloroform, others Ether, and still others the A. C. E. mixture, without causing a death. This is a marvelous record of safety and speaks in silent language for the inestimable merits of this Process as well as of these liquid narcotics.

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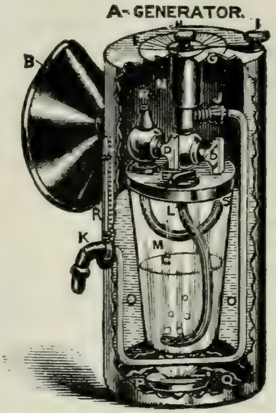
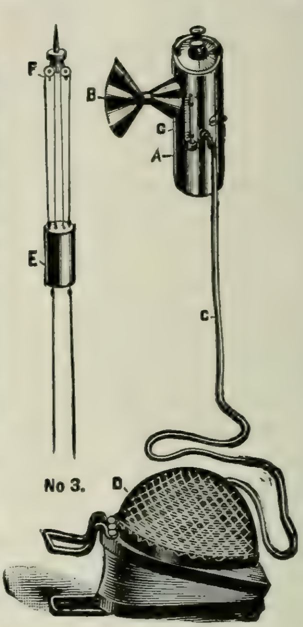
SCIENCE OF ANÆSTHESIA REVOLUTIONIZED

# DESCRIPTION OF APPARATUS

FOR

# HAYES PROCESS, ETC.





**DESCRIPTION NO I.**

A—Generator.
P—Face Piece.
M—Narcotic Chamber.
C—Narcotic.
R—Elbow, secured to Tube leading through the Bath.
J—Swivel connecting Tubes.
D—Stop Cock.
L—Tube conveying air to the Narcotic Chamber.
S—Conveying Anæsthetic to R.
Faucet—
N—Sheath.
F—Dial.
G—Index.
H—Knob for Regulating percentage.
I—Place for inserting water in Bath.
E—Place for inserting Narcotic in Chamber.
Q—Lamp.
Black R—Thermometer.

**DESCRIPTION NO. 2.**

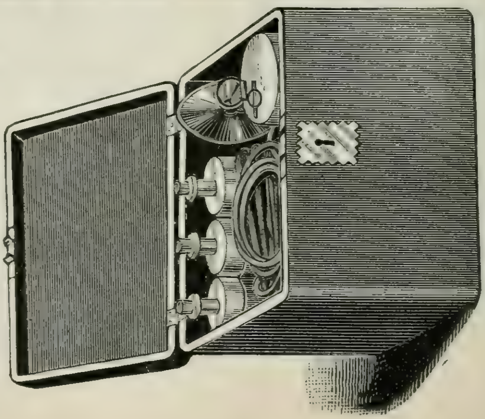
A—Generator.
D—Aerator.
C—Rubber Tube connecting Aerator with Generator.

**DESCRIPTION NO. 3.**

F—Pulleys.
E—Weight.

The Pulleys and Cord may be ordered, but do not usually go with the Apparatus

*Neat Portable Surgeon's Case.*



*Made of Morocco, Lined with Velvet.*

With "PURE NARCOTIZED AIR."

THE
DENTAL AND SURGICAL
MICROCOSM.

VOL. IV. JULY, 1895. NO. 3.

# HYPNOTIC SUGGESTIONS AS AN AID TO ANÆSTHESIA.

**BY CHARLES GILBERT DAVIS, M. D., M. S. A.**
Dean of the School of Anæsthesia, of Chicago.

Time is the great seive in which is sifted the accumulated thoughts of men. In it the debris is removed and only pure, sparkling truth remains. It is strange, but nevertheless true, that every great scientific advance in every department of human life, is met by the most determined, and I might say, brutal opposition. And yet, as the years flow on, there is ever but one result in all these conflicts; for truth is, and ever will be triumphant. Gradually the ignorant, stupid and cowardly attack ceases, the smoke of the battle passes away, the clouds are lifted, the din of contending voices is hushed, and lo! some fair new form is ushered upon the scene, a living, breathing reality—a new star is added to the galaxy of the scientific heavens.

What can exceed the bitterness of the controversy that for many years has been carried on over the subject of hypnotism, or hypnotic suggestions?

It is not my intention, in this article, to review the arguments pro and con. The salient points are constantly brought before the minds of the intelligent members of the profession, through the medical journals of the day. Neither do I wish to enter, at the present time, upon an elaborate expose of my views of hypnotism, as to what it is, how it acts, or its application to the cure of disease.—All of this will be reserved for another article which I hope, in the course of time, to produce. Suffice it to say, that for many years I have carried on my experiments with an idea of determining its merits, and now I am able to say, that I thoroughly believe the nineteenth century has evolved no therapeutic agent or remedial measure, all things considered, more potent or more capable of beneficial results than hypnosis.

In my address on this subject before the Psycicle Science Congress of the World's Congress Auxiliary, in 1893, I said: "Surgery and hypnotic suggestion will largely constitute the healing art of the future. It may not be in our day, it may be centuries hence. But it will come."

I am not at all convinced that this was extravagant language.

But without wishing to compass the entire scope of the subject relating to hypnosis in its application to disease, I wish now to call attention to its efficiency as an anaesthetic, and most particularly as an aid to the anæsthesia with chloroform and ether.

Ever since I became a student of medicine, I have recoiled from what I call the barbarous method of forced anæsthesia. I remember some of my first experiences in witnessing surgery, were twenty years ago, in the ———— Hospital of Cincinnati.

Here the patient was brought before the class and told to breathe the chloroform, and if he did not do it willingly he was compelled to do so by being held on either side by two stout porters, while the assistant placed a handkerchief over his face, held it there and poured on the chloroform. Convulsive with terror, screaming, struggling and pleading, his whole nervous system in furor of fright, he was finally overcome. My observations at the time, and I have never had reason to change them, were, that this method itself was almost as much of a shock as an ordinary operation.—Only a few days after I began my studies there, under just such circumstances as those described, I witnessed a death from chloroform. Suddenly, in the midst of all this contest between the patient and assistants, she ceased to struggle, became quiet, and the porters released their hold. She was dead. The post mortem as usual said "fatty degeneration." The scene impressed me, and I am sure has been a life lesson to my profit. Since then I have administered anæsthetics a great deal, and have had them administered under my directions, by assistants, thousands of times. I have never had a death. I do not boast of this; I am only glad. But I have always advised gentleness—the calm, quiet, soothing method.

A few years ago, the old custom was to fortify the patient previously to the operation, with a glass of brandy. I believe a few soothing, assuring words spoken into the ear of most patients at the time, will, as a rule, do more good than all the drugs of the pharmacopœia.

Ever since my boyhood, I have studied with interest the subject of hypnotism under its various names, phases and aspects. It has had to me a peculiar fascination.

Soon after beginning my medical studies and noting the anæsthesia of many hypnotic subjects, the idea naturally presented itself, of applying hypnosis to produce anæsthesia. Frequently I was successful, but not sufficiently often to indicate that, I could rely upon this method in all cases.

I have performed a number of minor surgical operations in which I used hypnotic suggestion with entire success, to produce anæsthesia.

For several years, the idea has seemed to me feasible of combining, in all cases, hypnotic suggestion with the chemical anæsthetic. I have been lead to this from observing a number of cases during the last few years, where such a combination was entirely satisfactory.

In 1888 I was operating on a case of fistula in ano.—The subject, J. R., was a man about thirty-two years of age, very nervous, pale and weak. He got upon the operating table with fear and trembling, and begged of me not to give him the chloroform, and was inclined to abandon the operation. I went to his head, closed his eyes, passed my hand quietly over his brow, and then made suggestions as to what I wanted him to do, and commanded him to go to sleep. In three minutes he was quiet. Dr. J. B. S. King stood ready with the anæsthetic and I motioned him to proceed, while I turned to arrange my instruments. Dr. King immediately ejaculated, "Why he is already asleep!" He had only that instant placed the inhaler to his face. Sure enough he was sleeping soundly. I proceeded with the operation, which occupied perhaps ten minutes. He suffered no pain, did not resist, and was easily aroused after I had finished.

Again, about six months later, I had occasion to give an anæsthetic to remove a number of wire stitches from the uterus of a patient, on whom I had performed trachelorophy. The lady was in a very weak, nervous and exhausted state. She dreaded the anæsthetic from recollection of its previous unpleasant effects. I immediately resorted to suggestion till I thought she was quieted and then asked my friend, Dr. M. S. Leech, who was present, to proceed with the chloroform. But as he placed the anæsthetic to her face he exclaimed, "The conjunctiva is already insensible." No more than a single whiff of the chemical anæsthetic was given. She did not resist during the removal of the stitches and was easily aroused, expressing herself as having felt no pain. Soon numerous other cases followed, in some of which a few whiffs only, of the chemical anæsthetic were necessary, and others required a continuance of from five or ten minutes.

In July, 1894, I delivered before the Chicago Baptist Hospital Training School for Nurses, a lecture on anæsthesia, and I presented before the class, at that time two young men whom I knew from previous experiments, to be slightly susceptible to suggestion. The first, Y. M., a young man of slender build, was placed on the operating table and told that he was to be put to sleep. The proper suggestions were made, and the dry cone was placed over his face, and he was told to breathe deeply. He soon slept soundly, and the conjunctiva was insensible. No chemical agent was employed.

The second, V. P., of strong, vigorous constitution, mounted the table with an incredulous smile. I produced a bottle of water from my pocket, saying I would give him a newly discovered and more powerful anæsthetic. With strong suggestions he soon yielded and slept. The conjunctiva was insensible, and he showed every evidence of thorough anæsthesia.

Recently I have made careful note of a number of cases both with and without suggestion. The following cases, taken consecutively from recent clinical work, are sufficient for illustration. Cases with suggestion and ether:

| | | | |
|---|---|---|---|
| Mrs. N. | Time, | 12 | Minutes. |
| Mrs. C. | " | 8 | " |
| Mrs. J. | " | 15 | " |
| Miss S. | " | 7 | " |
| Mrs. H. M. L. | " | 9 | " |
| Miss M. M. | " | 12 | " |
| Mrs. G. L. L. | " | 8 | " |
| Mrs. J. B. B. | " | 7 | " |
| Mr. J. G. | " | 13 | " |
| Mrs. G. D. B. | " | 9 | " |

Average time from beginning of ether to complete anæsthesia 10 minutes.

Cases where ether was employed without suggestion:

| | | | |
|---|---|---|---|
| Mrs. W. B. | Time, | 24 | Minutes. |
| Mrs. G. H. | " | 20 | " |
| Mrs. E. | " | 16 | " |
| Mrs. F. D. | " | 21 | " |
| Mrs. T. K. | " | 18 | " |
| Miss D. C. | " | 18 | " |
| Mrs. G. H. B. | " | 18 | " |
| Mrs. W. A. D. | " | 17 | " |
| Miss S. B. | " | 18 | " |
| Mrs. W. C. B. | " | 20 | " |

Average time from beginning ether to complete anæsthesia, 19 minutes.

There is no doubt but what any one of these patients in either of the lists have been never anæsthetized more quickly than they were. But in no instance was there any effect at haste, and in each individual case, all due precautions were used to insure safety. I am sure that patients are often overcome, asphyxiated as it were, by shutting off the air and crowding the anæsthetic, in three, four, five and six minutes, but in all of the above cases the correct gradual method was employed. And so far as possible, exactly the same method was used in each individual case.

It will be seen from these two tables that the time necessary for complete anæsthesia, is reduced nearly one-half by the use of hypnotic suggestions. I have no doubt that with more care a much greater reduction might be obtained.

The beneficial results from using hypnotic suggestions as an aid to anæsthesia are obvious.

1st. It calms the nervous system and fortifies the patient to withstand the surgical operation.

2d. It lessens the danger of shock.

3d. It lessens the time, and consequently the amount of anæsthetic.

4th. The patient awakens refreshed as from a natural sleep.

5th. I believe recovery in these cases is more rapid and satfactory.

Of course there is a wide difference between individuals as to their susceptibility to suggestion. On some it has but little effect, on others it enables us to reduce the chemical anæsthetic more than half, and occasionally we meet cases where it is within itself quite sufficient.

It can never when properly used, cause harm. Then why not always employ it? I cannot conceive of a case where it cannot be applied. The more intelligent the patient, of course the more readily we may speak to the nerve-centers and have them obey. Still to the insane, the idiotic and the unconscious babe, we may make suggestions to the sleep centers, by gentle motions and soothing tones.

I believe that hypnotic suggestion will, in many ways, but most particularly as an aid to the anæsthesia by chemical agents, prove a blessing to mankind.

## ALUMINUM SOLDERING.

Dr. Richardson, in the Aluminum Age, says:

"The only solder for aluminum which has attained to any extensive use, and which may be said to be the most successful thus far invented, is that of Mr. Joseph Richards, of the Delaware Metal Refinery, Philadelphia. Mr. Richards found that by adding a small percentage of phosphorous to the best solders hitherto used, they were invariably improved, the particular point of advantage being their increased ability to bite on the aluminum. The best alloy thus prepared contains zinc, tin, aluminum and phosphorous, the first two constituting the bulk of the alloy, and being united in their chemical equivalents as a true alloy. The solder can be used before the blow-pipe or with the soldering iron. In the former case, a little silver can be added to it without making it too hard to melt, and giving it a better color. For use with the copper bolt, this solder leaves little to be desired. The surfaces to be united are first scraped clean, and then tinned with the solder itself by rubbing it on hard with the bolt. The prepared edges are then soldered together with ease by using a hot iron and no flux of any description. This solder has been adopted for over two years by the Swiss Aluminum Company, the largest manufacturers of aluminum, by the largest makers of aluminum goods in America.

While nothing terrestrial can be said to be so good that no better could be wished, yet, in view of the improvements in soldering aluminum made since 1890, it may reasonably be asserted that a stisfactory solution of the problem has been reached."

# LOCAL OBTUNDENTS.

BY A. W. HAIDLE, D. D S.

(Read before the 38th Annual Meeting of the Michigan Dental Association.)

Local obtundents, or to use a more general term, local anæsthetics, are employed to temporarily abolish the sensibility of a part, and allow slight incisions or operations to be made painlessly.

Their effect is in some degree due to a paralysis of the end plates of the terminal branches of the cutaneous nerves, and possibly to some extent to a sedative action upon the blood vessels and tissues, analogous to that which is produced by rubbing or scratching, which gives temporary relief in itching. Local obtundents may be divided into two general groups:

1st. Agents which are applied or administered as drugs, either singly, or in combination with others.

2nd. Agents which are applied to produce thermal changes.

In the first division we find the following: aconite atropine campho-phenique, carbolic acid, chloral, chloroform, cocaine, menthol, morphine, opium, pyrethrum and veratrine.

As thermal agents we may employ: ice, ether spray, rhigoline, chloride of ethyl and chloride of methyl.

The greater number of the remedies mentioned in the first group, are rarely used alone, being more frequently employed in combination with other drugs, and we find in our dental literature and text-books, and in the discussions of dental societies, numerous formulæ given, some of which are good, others inefficient, and, still, others which should be used with great caution. In order to construct a formula which shall prove efficient in obtunding the sensibility of the oral tissues, it will first be well to examine into the histology and physiology of these tissues, and into their relations with the general nervous and vascular systems. We find that the mucous membrane covering the alveolar process consists of an epithelial covering, lying upon a connective tissue stroma, the tunica propria. The epithelium is of the stratified squamous variety, and is continuous with the epidermis on the one hand and with the covering of the pharynx on the other. It occupies a place as regards power of absorption, midway between the two, having greater power of absorption than the epidermis, and less power than the mucous membrane of any part of the alimentary canal below the mouth. The tunica propria is composed of interlacing bundles of fibrous connective tissue, and possess numerous simple papillæ, which encroach on the epithelial layer, but do not appear on the free surface of the mucous membrane.

The larger blood vessels lie within the sub-mucous tissue, and give off branches which extend through the deeper layers of the mucosa to the superficial portions of the connective tissue stratum; on reaching the outer boundary of the latter the arteries break up into rich sub-epithelial capillary net-works, and where papillæ are present, enter the minute elevations to supply their apices with terminal capillary loops. The nerve-fibers, largely of the medullated variety accompany the blood-vessels, and end in a sub-epithelial plexus; and special terminations—the end bulbs—are found in the apices of some of the papillæ.

It will readily be seen that for the drug to accomplish its purpose of destroying sensibility, it must pass through the several layers of cells which make up the epithelium, and which range from the irregularly-shaped columnar and polyhedral cells, to the large, flat and scaly type so characteristic of the outer layers of stratified squamous epithelium, and must therefore possess in a marked degree either the power of penetration or the property of being easily absorbed.

By comparison with the mucous membrane lining the lower portions of the alimentary canal, it is found that while the mucous membrane of the stomach and of the intestines is especially adapted to the function of absorption as well as of secretion, that of the mouth is distinctively a secreting and not an absorbing tissue.

When, therefore, the power of penetration or the property of being easily absorbed are not inherent in the drug which is to form the basis of the formula, it becomes necessary to add a drug which will aid absorption.

Absorption can be aided in two ways: first, by increasing the circulation at the point of application, which can be accomplished by gently rubbing the part, or by the application of irritant substances; and second, by the use of an agent possessing endosmodic power. Such agents we have in chloroform and ether. Water, oils and resins do not have this property.

It is thought by some that alcohol possesses powers of endosmosis, but Waller has proved by experiments on the skin that this is not true. While it is as great a solvent of the sebaceous matter found in the skin as chloroform, it is not absorbed as quickly as this agent. Experiments on this point were made with iodide of potassium, which is a drug very readily detected in the urine. Waller, therefore, concludes that absorption is aided more by the endosmotic than by the solvent power of a drug.

If the basis of a formula is not sufficiently powerful in its action, an adjuvant should be added—a drug which will intensify or enhance the action of the basis. Such a drug we again find in the volatile liquids mentioned above, which are also aids to absorption. Heated applications act more energetically by increasing the circulation in the part.

It may be necessary to add a corrective to the formula. The basis may be too irritant or caustic, and its harmful effects must be corrected. These effects may be either local or general, and the corrective used depends entirely upon the nature and action of the drug to be corrected. Only a few years ago chloral was extensively used as a local anæsthetic, and its irritant and caustic effects were demonstrated by the many cases of inflammation and sloughing of the part which resulted.

The local and the general effects of chloral are antagonized by carbolic acid, by atropine and by several others of the alkaloids. The nature of the action of these antagonistic drugs seems to be somewhat obscure. In commenting upon it, Brunton says: "Some regard the effect of one drug in counteracting another as a case of chemical combination or substitution, the second drug either becoming added on to a compound of the first with some of the tissues; or else displacing it from such a compound with the tissues. Others, again, think that no chemical action of this sort takes place, but that each drug acts upon the tissues by itself,—one, for example, exciting, and the other paralyzing."

Again, it may be necessary to add to the formula a limiting agent, a drug which will limit the endosmotic power of the basis. This may be accomplished in two ways: first, by the action of coagulants on the albumen of the protoplasm of the tissue cells; and second, by coagulative action on the blood capillaries and on the albumen of the serum contained in the tissues. Coagulation of the albumen of cell protoplasm may be produced by the use of such agents as carbolic acid, tannic acid, lead acetate, mercuric chloride, silver nitrate, copper sulphate, zinc chloride, etc., all of which combine with albumen to form albuminates. Coagulation of the albumen of the serum in the tissues, and of the blood capillaries, may be produced by the use of astringents, including among those already mentioned as coagulants, others of the mineral and vegetable acids, alcohol, alum, and still other salts of the heavier metals.

In nearly all cases it will be necessary to employ a diluent, and the agent employed for this purpose should also be a solvent. The nature of the diluent must depend largely upon the nature of the basis, the diluents commonly used being chloroform, ether, alcohol, distilled water, and glycerine.

Finally, it must be observed that the mixture is antiseptic, and that the agents employed are compatible with each other, to such a degree at least as not to prevent the accomplishment of the desired result. The mixture should be reasonably stable.

It will not be necessary to add to the formula a drug for each effect, for an agent may be employed to accomplish several results. As an example of such an agent, chloroform may be mentioned; this may be employed as an adjuvant, an aid to absorption, a diluent, and it is also a solvent of almost unlimited power and scope. A good formula is given in Gorgas' Dental Medicine, which is as follows:

| | | |
|---|---|---|
| R. | Tinctura aconiti | j fl. ounce. |
| | Menthol | x grains. |
| | Chloroformi | j fl. drachm. |

M. S. Apply freely to gum about tooth for several minutes.

Aconite forms the basis and is a powerful nerve sedative. Its action when applied locally is to irritate the sensory nerve endings, causing a peculiar numbness and tingling, and afterward paralysis. Menthol is employed as an adjuvant, has marked anæsthetic action and is also antiseptic. The chloroform is the diluent and is an aid to absorption as well.

Another, and an excellent formula from the same source is as follows:

| | | |
|---|---|---|
| R. | Chloroformi | |
| | Tincturae, aconiti | |
| | Alcoholis, aa | j fl. ounce. |
| | Morphinae sulphat | vj grains. |

M. S. Apply for one or two minutes to gum over root of tooth to be extracted.

A formula constructed by Dr. von Bonhorst contains:

| | | |
|---|---|---|
| R. | Chloroformi . . . . . . | |
| | Aetheris sulph . . . . . | |
| | Spiriti lavundulae . . . . | |
| | Pyrethri (fl. ext.), aa . . . . . | j fl. ounce. |

M. S. Apply for one or two minutes to gum over root of tooth to be extracted.

Among the drugs employed without combination with other drugs, cocaine is the most important. An Alkaloid occurring in colorless, transparent prisms, its salts are readily soluble in chloroform, ether, alcohol and water, and are rapidly absorbed.

The dose is gr. ss. to gr. j. For epidermic application a solution of chloroform may be used varying in strength from a 6 per cent. to a 20 per cent. solution. Dr. Hewitt, of Chicago, recommends the following formula for all operations about the gums:

| | | |
|---|---|---|
| R. | Cocaine . . . . . . . | cxx grains. |
| | Atropine . . . . . . . | 1-10 grain. |
| | Strophanthin . . . . . | 1-5 grain. |
| | Naphthol hydrate . . . | x grains. |
| | Oil of cloves . . . . | |
| | Oil of cassia . . . . . | |
| | Chloroform, aa . . . | ij drachms. |
| | Glycerine . . . . . . . | j. drachm. |

The basis of this formula is cocaine, which, used in this amount and proportion, makes a 20 per cent. solution, very strong for epidermic application. It should be used with caution, and never be injected into the gums. This formula is deficient in correctives. Strophanthin is a very unstable and unreliable heart stimulant, and the quantity of atropine is too small. Carbolic acid would be more efficient as a corrective than naphthol.

Among the thermal agents mentioned, ice is never used as an anæsthetic, but is frequently employed to reduce inflammation, having a pronounced sedative effect. The ether spray is rarely employed, not being so effective as others of the thermal agents mentioned.

Rhigoline, one of the lighter products of petroleum distillation, is also rarely used because of its odor and the inconvenience of its application. It is a colorless liquid, of a disagreeable odor, quite volatile and inflammable, and produces an effect similar to the other volatile, freezing agents.

Chloride of ethyl is probably the most convenient and popular of the thermal agents of the present day. It is a clear, colorless liquid, possessing an agreeable, ethereal odor, and boils at 50 degrees F. It is manufactured in France and is not found in the U. S. P. It is produced by the action of chlorine on ethyl alcohol, and is found in commerce in glass flasks which contain about three drachms. The method of application is to break the point of the flask, and after having protected the surrounding tissues, to direct the spray to the part to be anæsthetized. It evaporates very readily and causes intense cold, completely freezing the part, and rendering all slight operations painless. The best effect is produced when the flask is held at a distance of ten or twelve inches from the part, thus allowing the liquid to become vaporized before reaching the tissues. The patient should be instructed to breathe through the nose, and care should be taken that the application is not too prolonged, for if the part be too much deprived of blood, death, and subsequent sloughing of the tissue results. The anæsthetic stage is indicated by a whitening of the tissues and by the formation of ice crystals on the free margin of the gum.

Chloride of methyl, though not so extensively used, because of its greater comparative cost and clumsiness of the apparatus in which it is contained, is a gas at 70 degrees F. with a slight ethereal odor. It can be liquefied by pressure, and in commerce we find it in the liquid state held in copper flasks which contain about one quart.

As the chloride of ethyl, it is manufactured in France and is not found in the U. S. P. It is made from the remnants of beets used in the manufacture of beet sugar, extracting from these remnants the chlorate of try-methylamine, which upon the addition of heat produces chloride of methyl. Its action differs from the action of the chloride of ethyl only in intensity, the former producing more cold and in less time than the latter.

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In filling proximate cavities they should not be left flat, but contoured so that the walls of the teeth cannot touch each other again, and the filling should be left so smoothly oval that it will not allow the accumulation of debris.

# SIMPLE FACTS ON ANÆSTHETICS.

BY ALICE BUTTERWORTH, M. D., CHICAGO.

There has been so much activity in experimental study on the subject of general anæsthesia recently and so many exhaustive papers written on the subject that the "Beginner" often finds his a b c buried under a load of the higher mathematics. It is for him that I gather together these facts.

The major part of the work done upon the subject during the last decade has had its origin in the contest between chloroform and ether. Few conclusions have been reached that are universally accepted. The most trustworthy statistics show the danger from chloroform to be four times greater than that from ether, but the chloroform advocates shake their gory locks and say that deaths during the operation alone do not represent all the mortality from ether—and so that ball starts rolling again, gathering size and density as it goes.

The use of mixed anæsthetics is on the increase. The ACE mixture has advanced very much in favor during the past few years. It is often chosen by those who would avoid the dangers of chloroform on the one hand and the practical disadvantages of ether on the other. The administration of nitrous oxide first and then ether is confined to hospital practice, because of the complicated apparatus necessary.

The plan of administering chloroform first and ether after, or vice versa, is practiced to some extent in Europe. Vienna has many mixtures but few statistics.

The tendency of the best practice at the present time, however, is to choose the anæsthetic according to the patient or the operation to be performed.

Two points should be borne in mind:

First. All anæsthetics are dangerous; no care, no precaution, no particular apparatus or method of administration insures absolute safety.

Second. There is no especial mode of death under either anæsthetic. That ether always causes death by respiration and chloroform always by the heart is no longer tenable. Lay this away in your mind to prevent carelessness.

Various measures have always been resorted to before inducing anæsthesia, to modify the process and with a view to lessen its dangers. The one most generally used and in which the utmost confidence has been placed is a dose of some alcoholic stimulant. Clinical proof of the inefficiency of this measure is abundant and now it is thought to increase rather than diminish the danger of chloroform. One excuse for resorting to it is the great fear on the part of the patient. This condition is much better overcome by a hypodermic injection of morphine with atropine some fifteen minutes before the operation. The administration of morphine with atropine will also promote the prolongation of anæsthesia with a minimum of the agent and is the best means of warding off shock due to the operation. Pozzi says that to this method "can scarcely be awarded too much praise in operations of any considerable length."

There is a somewhat new idea of maintaining a reserve-guard of pure blood to be released in case of need. "Immediately before the anæsthesia is begun an ordinary Esmarch bandage is placed on one (or more) limbs sufficiently tight to obstruct the venous return and when the limb has been loaded with blood the constriction is increased to such an extent that all circulation ceases in the limb. The limb should be kept wrapped in a blanket with warm bottles about it. In case of dangerous narcosis release the band and elevate the limb."

It is better to use ether when obliged to entrust the anæsthetic to an unskilled assistant, as the limits of safety are more easily passed through inattention, carelessness or want of skill with chloroform than ether.

Nothing can be so prone to produce fatal syncope as the commencement of the operation before complete anæsthesia has been induced, for then you have a lowering of the vital functions caused by the anæsthetic and the shock of cutting sensitive tissue before the condition of the sensory nerves is in abeyance.

Chloroform is a powerful depressant poison, acting sometimes on the respiration, sometimes on the cardiac action, and sometimes on both together. It causes death by paralyzing the heart, and sometimes does this at an early stage of the administration when but a small quantity has been inhaled. The rate and depth of respiration influence the effect of chloroform more than any other factor. By rapid and deep breathing an overdose may speedily be taken, and due dilution of the vapor with air is not therefore a guarantee against accident.

The effect of ether upon the heart is in marked contrast with that of chloroform. Given less carefully and less gradually it causes but little change in the action or form of the organ. In its slight effect upon the pulse ether is an exception to all other anæsthetics. Yet in deep and prolonged administration similar changes occur with both, so that "while death from syncope will occur less frequently under ether than under chloroform, such a death is, from the pulse curve in ether narcosis, very possible."

All experiments, with the sole exception of the Hyderabad Commission, concur in supporting the conclusions that ether usually acts very much more powerfully upon the respiration than upon the circulation, but occasionally, and especially when the heart is feeble, ether is capable of acting as a cardiac paralyzant and may produce death by cardiac arrest at a time when the respirations are fully maintained; that chloroform is capable of causing death either by primarily arresting the respiration or by primarily stopping the heart, but that commonly both respiration and cardiac functions are abolished at or about the same time.

As to the resuscitation of patients in danger from anæsthetics. it is agreed that the treatment of both chloroform and ether narcosis should be identical.

Quickest and simplest is rectal dilatation. Artificial respiration still maintains a leading position. This is one point upon which authorities are unanimous. (Thank the Lord for one.) If respiration be suspended this is the direct way to restore it. If the heart is paralyzed nothing can restore its vitality, but its action may be so reduced that it is imperceptible, and manipulation of the chest walls will increase it. Early resort to it is important. The first half minute is the time that tells. It is said to be useless if not commenced before fifty seconds have passed. The passageway to the larynx must be kept free from mucus, blood or vomited matter, the tongue drawn well forward and the mouth open. Thorough expiration should be first effected to expel the anæsthetic vapor from the residual air. Compress the thorax and abdomen with both hands, one thumb pushing deeply into the space over the heart between the apex beat and the sternum, and this repeated thirty to fifty times in a minute. Never strike the patient little blows on the chest. It worries and annoys the operator and does no earthly good.

There is strong clinical evidence in favor of inversion of the body, though the old accepted way is being torn to tatters.

Heat will excite a narcotized heart to resume work. A quart of hot water injected into the rectum while the patient is inverted is standard treatment. Moist heat over the heart is valuable; apply steaming hot cloths, hot enough to blister. Heat is better than cold, but the application of ice over the heart or ice in the rectum will sometimes reflexly excite vigorous cardiac contractions. Hot salt water by the pint pumped directly into the blood current to stimulate both heart and respiratory centers of the medulla is warmly advocated. The temperature of the solution should be 120 degrees F.; the strength about a heaping teaspoonful of sodium chloride to a quart of sterilized water. It is urged that this solution be injected directly into the femoral artery, the aspirating needle being inserted into the artery under Poupart's ligament.

Fifteen to twenty-five minims of aqua ammonia fortior diluted with four times its bulk of water may be thrown directly into a vein of the arm and repeated in fifteen minutes if necessary.

Strychnine produces a marked stimulating effect upon the respiration with a rise of blood pressure. It is recommended as "the strongest stimulant of the respiratory centres and of the motor caridiac nerves."

Digitalis given hypodermically exercises a marked influence upon the circulation.

The benefits of galvanism remain unproven.

Late experiments shew the administration of alcohol and ether not only useless but injurious.

Of course, if the patient is able to swallow, give hot stimulating drinks, black coffee for instance, but not alcoholic. Alcohol should not be used as a remedial agent because it is a narcotic, and the patient is already suffering from too much narcosis.

Considerable attention is directed of late to the purity of chloroform. Cough, vomiting, bronchial hypersecretion and arrest of respiration are attributed to impure chloroform; but in this country pure anæsthetics, the product of reliable manufactures, are everywhere at command, and a complaint on this head is a convenient explanation of death for the relief of the administrator. Use as many of your weapons at once as are deemed necessary.

The accident is appalling, and needs a cool head and instant resource. Every moment is golden and indecision or unwise choice may cost a life.—Journal of Orificial Surgery.

The above article contains some useful hints to the student, but is quite replete with errors against which the reader should guard while selecting what may be of profit in his daily duties. It will be readily seen that the writer, like many others, makes no distinction between an anæsthetic and a narcotic liquid, such as chloroform, ether, etc., which at most can be but a subordinate element in the anæsthetic. The all important element in any anæsthetic is free oxygen, which is the supporter of combustion and sustainer of life. Of this she takes no account in her discussion of the subject. She entirely ignores the manner of making and administering anæsthetics. In this she follows the general trend of those who write without thoroughly studying the science first and knowing the causes of results. Any one who has given the science of anæsthesia proper attention should certainly know that neither chloroform nor ether contain free oxygen. That the anæsthetic must be made and that the results depend upon the making and administering of the agent.—Editor.

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The twenty-fifth annual meeting (the Silver Anniversary) of the New Jersey State Dental Society will be held in the Auditorium, Asbury Park, N. J., commencing Thursday, August 1, at 10 A. M., and continuing through Friday, Saturday and Monday A. M., closing in time for the meeting of the American Dental Association commencing Tuesday, August 6, at 10 A. M.

The Auditorium is the ideal place for holding a summer dental meeting, being situated in the middle of an entire block fronting the surf, with large windows opening from every side in one continuous row, thirty large windows with north light for clinics, and 390x29 feet for exhibits.

A branch of the Asbury Park post-office will be established in the Auditorium, and a bureau for general information with attendants constantly on hand.

The New Jersey headquarters will be in the Hotel Columbia, with rates from $2.50 to $3.00 per day. Several large hotels have made contracts from $2.50 to $4.00 per day, and smaller hotels from $8.00 to $12.00 per week board.

Full particulars and rates, with map of Asbury Park and plan of the Auditorium, will appear in the program.

Chas. A. Meeker, D. D. S., Secretary.

29 Fulton St., Newark, N. J.

# A SUGGESTION TO PREVENT NAUSEA FROM THE USE OF ANÆSTHETICS.

E. H. PRATT, M. D., LL. D.

That the mental attitude which patients entertain toward an anæsthetic as they pass under its influence has everything to do with the degree of disturbance which they experience from it, has been demonstrated so many hundreds of times that it is no longer a debatable question. The force of suggestion so powerful in such cases should be utilized much more extensively than it is. Sometimes a sentiment of fear, dread or disgust is just profound enough to induce a stomach to unload its contents by way of the mouth. Sometimes it is profound enough to induce violent retching even when the stomach is empty. Sometimes it is so profound that instead of causing nausea and retching it stagnates a lung into pneumonia, a kidney into nephritis, a liver into henatitis, or a brain into meningitis. That serious consequences following a properly administered anæsthetic are in most cases a product of apprehension and mental hostility to the proceeding on the part of the patient is perhaps not generally admitted to be a fact, but we believe as the profession awakes to the stupendous action of mind over matter its opinion upon a good many subjects is very liable to undergo radical changes and the ideas as to the causes of the ill effects which follow anæsthetics will be found among those that will be most radically transformed. Fear can pale the face, it can sweat the entire integument, it can produce incontinence of urine and feces, it can produce insanity and death. Most surgical operations, especially in private practice, are attended with an atmosphere of the most intense fear and apprehension which affects the patient, the friends, the assistants, and even the surgeon himself. This intense pall which inaugurates most operative procedures is by no means conducive to the highest type of surgical achievement. It makes the surgeon awkward, puttering, and oftentimes reckless and clumsy in his operations. It makes the assistants awkward and inefficient and occasions no end of mistakes and delays. It makes the friends obtrusive hindrances to the accomplishment of whatever is necessary, and it produces a terror-stricken condition of the patient, which bears the anæsthetic poorly, wakes him with fright, worries him into septic conditions and prejudices his recovery. "Worries him into septic conditions" may be an expression to which some will take exception, but the expression is used advisedly and the truthfulness of the phrase can be at any time maintained.

In receiving those who seek admission to our homes there are three distinct methods of doing so. In the first method the reception is hostile. If the doors are entered they must be forced, and every step of the invasion is contested by its inhabitants and full possession by the invading party is a conquest. Their exit is followed by no regrets on the part of the inhabitants of the house, because they did all they could to prevent its invasion and, regardless of the damage done, their conscience is clear and the evil consequences that follow the forced visit are entirely unavoidable and consequently do not rankle. They were simply a misfortune. In the second method the door is reluctantly opened and the guest, although unwelcome, is permitted to enter. He is allowed a seat at the table, under protest, and a night's lodging furnished him as a mere matter of tolerance. Like the conscience of one who lacks the courage of his convictions, like the smoke of a fire which smoulders but does not break out, the departure of the merely tolerated guest leaves behind him an uncomfortable feeling in the household which he has entered. He was not welcome, and yet permitted to remain. What he said and did was not indorsed, but it was listened to. His entrance and his presence were at the sacrifice of both comfort and self-respect on the part of the inhabitants of the house, and they will not soon cease rebuking themselves for permitting the intrusion. The depression after such a visit is long-lasting because it involves a condition of self-rebuke with its attendant regrets, remorse, and other forms of self-condemnation and self-depreciation. In the third method is seen the exhibition of hospitality. The doors are thrown wide open, hands are extended in hearty welcome, and every act and expression is an utterance of joy at the recent arrival. The best that the house affords is immediately in demand and there is no desire for a hurried departure of the guest, but on the contrary, an earnest effort to render every moment of his stay as enjoyable as possible. The guest may be lame, he may be blind, he may be ill-favored, he may be unpopular elsewhere, but here he is loved for what he is rather than for what he is not; for his good qualities rather than for his bad ones; his imperfections are sufficiently insignificant to be entirely overlooked and forgotten. For his usefulness, for the good that he has done or can do, a something that is in him noble, or commendable, or praiseworthy, he is valued and welcomed. His visit will prove an inspiration and everybody in the house will be the better for his coming.

Let this be a parable, and it will explain many of the phenomena connected with the administration of anæsthetics. The fighting, twisting, turning, writhing patient, who must be anæsthetized and whose consent cannot be obtained, will have a hard time of it, as will also his attendants. The administration of the anæsthetic while difficult of accomplishment and perhaps attended with some nausea and vomiting, will not be liable to produce serious consequences because its administration was never consented to. He fought to the extent of his ability along the whole line of battle and was overcome simply because he was conquered, and his antagonism will impregnate his every organ even during his sleep. He will not be subsequently depressed or humiliated or nauseated for any prolonged degree, simply because he has lost no self-respect; he fought honorably and, although conquered, he did his best and has nothing to regret. He is glad it is over and will now make the best of it. Such patients do not suffer pneumonia or nephritis or hepatitis, or inflammation of any other organ in conquence of anæsthesia. As soon as the cone is removed from their faces their entire system will expell the fumes of the anæsthetic as rapidly as the reactive power of the patient is capable of accomplishing it. The fight is not over and the repelling forces will not be mustered out of the service until every vestige of the anæsthetic is eliminated from the tissues.

It is those who yield an outward consent to the anæsthetic but at the same time maintain a deep-seated repugnance to it, who are outwardly calm but who boil within, who present a brave exterior but who are cowardly at heart, who will suffer most. They are not injured, but they suffer just the same. They consent to travel, but their night is dark and their sky starless. They obey orders, they breathe when they are told to, they submit to whatever is imposed upon them, but their heart is weak and their courage is gone, and every organ of their bodies is thoroughly tinctured by the profound consternation which pervades their every tissue. Processes stagnate under an anæsthetic in such cases, and weak organs can suffer such degrees of congestion as to predispose to subsequent complications.

On the other hand, where a patient can be true to a proper appreciation of the value of an anæsthetic and retain an active sense of gratitude for the privilege of being permitted to enjoy its benefits, and suffer no deviation from this conception to stagger his purpose of welcoming the wonderful sleep which it is his privilege to enjoy, the anæsthesia produced will not be accompanied by nausea, or be attended with serious consequences of any character whatever later on.

The education of patients into a proper attitude not only toward the work to be accomplished but also toward the anæsthetic under which it is to be undertaken, is a matter of no small consequence, especially in major operations.—Editorial in Journal of Orificial Surgery.

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For Hypnotic Criminals.—A good story is told of a judge who lately had the hypnotic plea raised before him by a burglar. The prisoner claimed that he did not know that he was "burgling;" that he did it automatically and unconsciously, under the direction of a hypnotist. The judge said that he would give him the full benefit of the law and also of his hypnotic misfortune. He thereupon sentenced the man to ten years in state prison, but told him he could, if he chose, send for the hypnotist and have himself made unconscious for the entire term of his imprisonment.

"The same power," said the judge, "that enabled you to commit the burglary and not know it, ought also to enable you to suffer imprisonment, with hard labor, and not be aware of it. At any rate, this is the best I can do for you."—Albany Times-Union.

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The Natural Length of Life.—Sir Benjamin Richardson, M. D., of England, thinks that the normal period of life is about 110 years, and that seven out of ten average people could live that long if they lived in the right way. They should cultivate a spirit of cheerfulness under all circumstances, and should learn to like physical exercise in a scientific way. No man, he says, need be particularly abstemious in regard to any article of food, for the secret of long life does not lie there. A happy disposition, plenty of sleep, a temperate gratification of all the natural appetites, and the right kind of physical exercise will insure longevity to most people.—The National Popular Review.

# ARSENIC AS AN OBTUNDENT OF SENSITIVE DENTINE.

BY L. C. WASSON, D. D. S.

Much has been wrtiten and said of late on the subject of painless dentistry; in fact, painless dentistry has besome a fad with the American people, and the dentist who does not perform painless operations is regarded by a large percentage of his patrons as unskillful and behind the times. The busy man has the question asked him every day, "Doctor, can you fill my teeth without hurting?" If he answers in the negative, he is conscious that he has fallen in the estimation of the patient. I recently read an article from the pen of Dr. W. H. Trueman, in the Office and Laboratory, on the subject "Should Arsenic ever be Used as an Obtundent?" In the article referred to, the doctor mildly disapproves of its use, but at the same time reports a number of cases where it was used with apparent benefit to the patient and no unfavorable results, thereby leaving the impression that the use of arsenic is permissible under certain circumstances. That the Doctor intended to discourage its use, I have no doubt, but his article is misleading and will undoubtedly have a tendency to tempt younger members of the profession into a very dangerous practice, and will also furnish the unprincipled scamp with a reasonable excuse for using arsenic in his so-called painless dental operations.

I recently had an experience with a patient from one of these painless shops that I shall not forget soon. On February 24th, a young married lady, a teacher in a neighboring State, was brought to me for treatment, and I can truly say that in the thirty years that I have practiced denistry I have never seen a more pitiable case. The history of the case, as I then learned it, was as follows: A few months previous the lady had occasion to go to a dentist to have some teeth filled. The teeth were very sensitive and the doctor told her he could use a preparation that would entirely relieve her while preparing the cavities. This was, of course, what she wanted, and she readily consented to its use, not dreaming of any danger. The doctor made his application in several of her teeth and directed her to call again the next day, which she did, and had several of them filled without any of the tortures of the previous day. Believing that she had found a truly scientific man in the person of her dentist, she sounded his praises wherever opportunity offered. A month later some of her teeth began to get sore, and one after another abscessed, until life became a burden to her. She had some of them opened and treated and one of them extracted, but with little or no benefit. Her suffering steadily increased, until she was compelled to give up her situation and go in search of relief.

On the advice of friends she went to Chicago and consulted an eminent member of the profession, who advised her that the superior teeth must all be removed and a portion of the superior maxillary bone. This so alarmed her that she returned home without having anything done. Her condition steadily grew worse. The pains, which had heretofore been confined to the teeth and alveolus, suddenly became periodical and greatly intensified, and were seemingly located in the frontal sinus. These periodical attacks came on several times during the twenty-four hours and often lasted for an hour or more, during which her suffering was beyond description. Nothing seemed to afford her any relief, not even hypodermic injections. Under this agonizing strain her nervous system broke down completely and she became almost a mental as well as a physical wreck.

About this time her brother, who resides in the city, brought her here in the hope that something might be done for her relief. On Feb. 24th I saw the case with her physician and made a careful examination. I found the teeth from the second molar on the right side to the first molar on the left side apparently dead and most of them loose; the alveolar process badly necrosed and several pieces loose, but could not detect any disease of the maxillary bone, except the palatal portion on the right side. Pus was oozing from the gum from many places, and altogether it presented as sickening an appearance as any case I can remember to have seen. The periodical character of the pains made me suspicious that there was a disease of the antrum in connection with the other trouble, but the absence of any unusual discharge through the nares or any displacement of the bones of the face seemed to indicate that the antrum was not involved. After consultation with the physician in attendance, I recommended the immediate removal of the affected teeth and all detached pieces of the alveolus. As this seemed to offer the only hope of relief, she finally consented to have it done, and on the following day, I removed the teeth and all loose portions of the alveolæ. When the teeth on the right side came away, my suspicions as the condition of the antrum were quickly confirmed, for a quantity of pus of such a character as is never found elsewhere quickly followed their removal, showing that the roots of some of the teeth must have entered the cavity of the antrum. Upon examination, I found this to be true. Both the palatal roots of the first and second molar pierced its floor. I enlarged the openings into the antrum, so that I could thoroughly cleanse it, after which I made a careful examination, but found no diseased or necrosed bone within the walls of the cavity. I applied the usual remedies and cleansed daily with water as warm as the patient could bear. After removing the loose or detached pieces of the alveolus and cleansing with warm water, I applied daily, to all the exposed surfaces of the bone, a fifty per cent. solution of hydrochloric acid, which resulted in the exfoliation of numerous pieces of carious bone. The physician in charge of her general health prescribed tonics and a generous diet. At the end of two weeks her condition was greatly improved, and the pains had almost entirely disappeared. A month later the case was discharged apparently well, and has continued in that condition up to the present time.

This is a case where the use of arsenic as an obtundent was not permissible, but I fancy some gentleman will take the floor as soon as there is an opportunity and say this is an unusual case; that arsenic does not always produce such results. That I concede is true, but who among us is competent to judge which of our patients have those idiosyncracies, and who have not? All will agree that some are more susceptible to the influence of the drug than others, and if but one case in a hundred be found, or in five hundred, is not that enough to condemn the use of arsenic for such purposes?—Western Dental Journal.

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The National Association of Dental Examiners.—The annual meeting will be held in the parlors of the Hotel Columbia, Asbury Park, N. J., on Monday, August 5, at 10 A. M., and at other times as becomes necessary between the sessions of the American Dental Association. It is important that every State Board be represented. Applications from Boards not in membership will receive immediate attention.

Chas. A. Meeker, D. D. S., Secretary.
29 Fulton St., Newark, N. J.

# THE BLOOD-ALTERATIONS OF ETHER-ANÆSTHESIA.

John Chalmers Da Costa, M. D., Demonstrator of Surgery in the Jefferson Medical College, Philadelphia, in a very interesting paper on this subject (Medical News, March 2, 1895), arrives at the following conclusions:—

1. Etherization produces a marked diminution in the hæmoglobin of the blood.

2. The red corpuscles and the hæmoglobin are especially affected in blood previously diseased, in such conditions, for instance, as anæmia.

3. Irregular reports are due to faulty observation, to the presence of altered hæmoglobin in the blood, to the faulty aberration as to color of a Fleischl instrument, or to taking the blood before anæsthesia is completed.

4. The white corpuscles show irregular changes which are not characteristic, and exhibit variations not more pronounced than would be found in the same number of samples of normal blood on different examinations.

5. Age does not apparently influence the results.

6. Ether-pneumonia may possibly be due in some instances at least, to the action of intense cold upon the lungs, produced by the action of ether-vapor.

7. Œdema of the lungs may arise from contraction of the pulmonary capillaries, thus producing a loss of vis a tergo and damming up of blood in the veins. Furthermore, the same condition may produce sudden paralysis of the heart.

8. The often-quoted observation as to the effect upon the hæmoglobin of shock and hemorrhage requires enlarged repetition upon human beings before the statements can be unreservedly accepted that hemorrhage causes a great fall in the amount of hæmoglobin, but that shock does not affect it.

9. The chilling of the blood-stream may be responsible for the nephritis that occasionly follows etherization.

10. Prolonged anæsthesia profoundly deteriorates the blood and strongly militates against recovery; hence rapidity of operation is most desirable.—The College and Clinical Record.

# A NEW METHOD OF NARCOSIS.

At a meeting of the Berlin Medical Society, November 28, 1894, Dr. P. Rosenberg described a new method of combined anæsthesia which he trusted would entirely prevent the lethal action of the chloroform on the heart. He has demonstrated by experiments on aimals that cardiac syncope, during chloroform cous membrane and transmitted to nerves having a paralyzant action upon the heart and respiration. By anæsthetizing the mucousmembrane of the nose with a spray of cocaine, these reflex disturbances are prevented, and, in view of the fact that cocaine is an antidote to chloroform, its absorption will in another way obviate the injurious effects of the latter.

Dangers of Cocaine.—Dr. A. R. Baker, of Cleveland, Ohio, in a paper published in the American Journal of Ophthalmology, recapitulates the dangers of cocaine in a collection of ten fatal cases of poisoning by the drug. The smallest fatal dose where a measured quantity was given was two-thirds of a grain, which was injected into an eye, with the result that immediate unconsciousness was produced, followed by death in four hours. One grain injected into the gums by a dentist produced death in a few minutes. The application of a ten per cent. solution to the larynx with a brush was also fatal, unconsciousness following almost at once and death in three hours. The author also reports a case where the instillation of a six per cent. solution was followed by alarming depression, with periods of unconsciousness attended with delirium.

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Illinois State Dental Society.—The thirty-first annual meeting of the Illinois State Dental Society was held at Galesburg, May 14 to 17, 1895. About 200 were in attendance. The following named persons were elected officers for the ensuing year: President, Walter A. Stevens, of Chicago; Vice-President, C. R. Taylor, of Streator; Secretary, Louis Ottofy, of Chicago; Treasurer, Edgar D. Swain, of Chicago; Librarian, J. R. Rayburn, of Fairbury; Chairman of Executive Committee, W. A. Johnston, of Peoria. The next meeting will be held at Springfield, May 12 to 15, 1896.

Louis Ottofy, Secretary.

Masonic Temple, Chicago.

## HYSTERICAL ANÆSTHESIA.

A large share of hysterical patients, when placed in a condition in which a healthy person would suffer more or less severely, conduct themselves as if nothing had happened. There is no reaction and they do not complain if they are pinched, pricked or burned. Ask them, and they declare they have not heard a sound, or seen an object that has been placed in a bright light before their open eyes. This is the condition of the patient that is styled anæsthesia. It is not always present in this disease, for, as we shall see, there are certain moral symptoms which are less distinct and pathognomonic that may possibly substitute it. But, in one form or another of its various phases, this anæsthesia is certainly present in the great majority of cases, and it may be considered as essentially characteristic.

The hysterical anæsthesia may take the form of diminished sensibility (hypoæsthesia); or it may affect any or all of the senses tactile and muscular, taste, smell, hearing, vision, etc. It may involve the skin, the mucous membranes, at least wherever they are accessible, as in the epiglottis and the pharynx; and wherever a sense is complex it may impair a portion of it. In a word, there is not one of the many senses, general or special, that may not be either modified or suppressed by this peculiar form of anæsthesia.

Sometimes it is limited to a single sense as that sense is related to one object, or a class of objects, while in other respects there is nothing morbid. This fact is often taken advantage of by the long-haired mesmerist, and by the modern hypnotist, who, in the light of clinical research, have a very questionable way of explaining why an hysterical patient may sometimes see everybody else in a room and yet can neither see nor hear a certain person that is named. The same thing is an element in somnambulism. An odd form of this peculiar limited insensibility is illustrated by a case in which a young girl, both of whose hands were absolutely anæsthetized could still recognize by the touch two articles of her toilet, viz., her ear-rings and her shell hairpins. No other thing that was placed in her hands could possibly be identified by her. Another just such patient could tell by the touch if her hair had been properly dressed, but could distinguish nothing else.

Of localized, or regional anæsthesia, the most curious is hemianæsthesia affecting one-half of the body, and most often the left side. If it is complete there is no impression whatever from tactile, thermic or muscular irritants. Sometimes the face is insensible on one side and the body on the other; and again there are zones or islands of the surface that are anæsthetized upon both sides indifferently. Akin to these are cases in which this peculiar symptom is limited to the whole or to parts of the fingers or to the thighs, as well as those in which, after recovery from the more general and extended varieties, a sort of anæsthetic bracelet remains about the wrists or other joints. And what is significant, as shown by M. Charcot, is that in all of its multiple forms this curious affection is not due to the involvement of any special nerve or nerves, artery or arteries; is not anatomical but physiological, not organic but functional.

When it is general or complete, while there may of course be some such accidental condition as spasms or paralysis, or œdema, they are exceptional. A common accompaniment, however, is pallor of the surface and a failure of the blood to flow from the cutaneous capillaries after a prick or a slight wound. A singular case is cited in which a young girl with right hemianæsthesia had for some time taken pills of the nitrate of silver. She then took a bath after which the entire skin of the affected side became decidedly brown in color, while that of the sound side remained white and natural.

In certain cases of hemianæsthesia of the hysterical sort the resistance to the electrical current is very much increased. Exceptionally in these cases there is neither a change in the temperature and the color, nor in the production of perspiration and the nutrition of the part affected.

Concerning the majority of the reflexes, the patellar, the cremasteric, Rosenbach's abdominal do., the vascular and secretory reflexes, those of the erectile organs, and even the cardiac and the respiratory reflexes that depend upon cutaneous excitation, we have always found them to be preserved. If they are sometimes weakened, we should not forget that this may happen in a healthy person. I also believe with M. Parinaud, that the pupillary reflexes are almost always intact, even when there is a complete hysterical amaurosis. If there is an exception to it as M. Briquet has shown, it is when the pupil is large and dilated; and M. Koenig has recently told me of a case of amaurosis which appeared to be hysterical, with permanent dilatation of the pupil. It is possible that in this case there may have been some other trouble of a motor kind, but it is certainly very rare. M. Pitres has recognized another and a very interesting pupillary reflex which persists despite the anæsthesia, the pupil dilates when the anæsthetic skin is pricked or decidedly pinched, although the patient is not sensible of any painful impression. I have repeated the experiments of M. Pitres in several cases and with the same result.

Certain other sensitive reflexes, as from tickling the soles of the feet, the flanks, or the pharynx to excite nausea, and the palpebral reflex from touching the conjunctiva may, however, be altered or suppressed. They are often absent.

Those hysterical patients whose attention has not been called to it by over-sympathetic friends, the doctor, or a specialist, are often quite ignorant of the existence of decided and extensive anæsthesia. Such a thing never happens when the loss of sensibility depends upon organic disease.

A young girl of twenty fell through a glass door and a piece of the glass was deeply imbedded in the lower face of the right wrist, just below the thenar eminence. The hæmorrhage was arrested and the wound healed pretty well, when soon after she sought advice for a numbness in the right hand. There was no paralysis, but a persistent and torturing lack of feeling in the palm of the hand, slight in the fingers and worse at the thenar eminence. This condition evidently involved a portion of the median nerve, but in taking the history of the case it was discovered that she was an hysteric, and that the whole left side of her body from above downward was completely anæsthetized, a fact of which she had said nothing. "Why did you come here," said the doctor, "to complain of a lack of feeling in the palm of your hand when you had not discovered that the whole of your left side was in the same condition?" The poor girl was puzzled and very much frightened, but finally said: "What could I do? I know what I suffer from my right hand, but the numbness of my left side has never given me any trouble."

That hysterical anæsthesia does not depend upon a serious lesion of the nervous system is proved by various clinical tests. It may last for a lifetime, for from one to seventy-five years, for example, without any essential or perceptible change. It may be modified by the recurrence of the hysterical fit, being habitually worse before, during, or after the paroxysm, which fit may be merely a mental storm without muscular spasm. During natural sleep the tactile sensibility often returns; and so it may under temporary mental excitement, as when the patient is drunk, or is under the influence of chloroform, or of a hypodermic of morphine. Electricity, magnetism, somnambulism, hypnotic suggestion, that would be powerless if it were dependent upon organic causes, may also dispose of it temporarily or entirely. Whatever jostles the mind into a new train of thought, especially if it is suddenly applied, and without warning or any curative intent, so far as the patient knows or is concerned, may have the same effect. And, even if these very agencies and conditions increase the trouble, as they sometimes do, they equally disprove the theory which refers the anæsthesia to an organic cause.

But this peculiar affection is contradictory as well as changeable, in which respect as in others it is typical of mental alienation. The most interesting symptoms of this sort are those of unilateral amaurosis, which can be identified by ocular experts, and which under its different forms has a curious clinical history; hysterical paraplegia with total anæsthesia; pseudo cataleptic seizures from fright, chagrin, etc. It is always associated with some form of mental distraction, and may be recognized by various methods of diversion in the way of inquiry, surprise and the shrewd resources of the detective. And yet, because of its admixture with ideas that are more or less "fixed" in the mind of the patient, it is often easier of diagnosis than of cure. For, if in psychology the sensations are what atoms are in chemistry, these hysterical compounds may not always be so easily decomposed and destroyed as we could desire.

Hysterical anæsthesia has been tested by various experiments which are cited by the author; but we are chiefly interested in its clinical verification, for here as elsewhere clinical facts must guide conjecture to certainty. There is a decided significance in the fact that in the hysteria of very young subjects this anæsthesia is lacking. In most cases it is only when the victim is from fifteen to twenty-five years old that this symptom takes on a pronounced form. Prior to that time there may have been an indifference to the action of surface irritants, or a suspicion of anæsthesia that has finally developed into complete insensibility. This symptom therefore undergoes a species of progressive evolution, the early history of which, although it cannot be known or recognized in every individual case, is of the utmost importance to the practical physician.

The possible involvement of vision and audition in hysterical subjects, and their trick of economizing and manipulating what comes to the brain through the eye-gate and the ear-gate of the perceptions is exposed in the following paragraph:

Hysterical patients very seldom and only partially lose the sense of hearing, because it is indispensable to the social life which they do not wish to renounce. They more often lose their vision, but never completely; for I have never known absolute hysterical blindness to persist more than a few hours after the fit. If this does occur it must be very rare. If the hysterical anæsthesia was due to a common lesion why should it not most often affect both eyes instead of one? On the contrary, if it is due to mental distraction that depends upon a morbid perception, we can understand why these patients always reserve enough of visual capacity to answer their purpose and without which their lives would be wretched. They very willingly let go their tactile sensibility because practically it is of less importance to them.

In fully developed hysteria this symptom may become less changeable and more fixed and permanent, and this is why it is more difficult of diagnosis in chronic and confirmed cases. The habit becomes second nature; delicate tests do not always avail in its recognition as before; and under these circumstances the whole clinical history must be taken into account before a safe and proper diagnosis can be made. Fortunately, even when they are indellible, these anæsthetic stigmata are likely to be mixed with those of a lighter sort by which their true origin and nature are betrayed. Sufficient data, whether antecedent or of a complicating sort, can always be elicited to satisfy one that in its essence the disease is mental, or psychological; that it does not really exist in the extremities, the spinal cord, or in the basilar centres, but in the mind itself.

Among the disorders of sensation, analgesia or the absence of sensibility to painful impressions, has been curiously regarded as very strange, and as having in it something of the supernatural. That this condition may result from perverted mental states, whether as the effect of disease, exhaustion, or hypnotic experiment and "suggestion," is a matter of every day observation. It will suffice to remember that pain is not a simple thing which can be isolated, or that may exist singly and alone, like the sense of touch, or the recognition of color, but it is a compound that cannot be detached like other sensations, for it is dependent upon a species of emotion which disappears along with certain incidental conditions.

Of organic anæsthesia, which consists not only in a loss of tactile sensibility in the members, but also of the idea or notion of their existence, some very interesting items are presented. One of Charcot's cases, in which a patient complained that his arm was both painful and absent, is cited. This with its various modifications is a form of the trouble that is rare and usually of short duration. But it is not so with the loss of organic sensibility that takes no heed of hunger, thirst, the call to urinate, etc The ability to live and to subsist in comparative comfort under these circumstances is one of the anomalies of the hysterical state.

Urethral anæsthesia in which there is no response to a strong electrical current is not infrequent, but a singular fact in this case is that hysterical incontinence of the urine is much less common than its retention. Sometimes the same insensibility extends to the rectum.

The genital sensibility is usually preserved, even when there is a widespread cutaneous anæsthesia; and since most of the reflexes are intact, the function of the erectile organs is not destroyed. Exceptionally, however, the parts may be entirely destitute of feeling and the victim become frigid. I have at least two very remarkable cases of this kind under my care.

The loss of the muscular sense to such a degree that fatigue does not follow the most violent exertion, whether it be taken in a voluntary way under strong emotional excitement, in spasmodic and convulsive states, or from the pressure, torsion or traction of the muscles, is kinesthesic, and by no means uncommon. We may find illustrations of it in the sick chamber, where a fond parent or relative seems to be possessed of more than human endurance; in camp meeting catalepsy; and even, if his story is true, in the extraordinary ability of the young doctor to do an incredible amount of work without a corresponding weariness of the flesh!

This portion of the volume ends with directing the attention to certain modifications of the tactile sense not already mentioned.

Thus, there may be a loss of the perception of pain, but not of the touch; the sensibility to cold and heat may continue alone, while that of pain and the ordinary touch have disappeared, or vice versa. When these sensations are vague and incomplete they become very confusing. Such a condition is apt to follow a prolonged state of somnambulism, in which the patient may not be able to recognize one side of the body from the other, one hand or one eye from the other.

In anæsthesia of the special senses not already referred to we have that of sight in which the visual field is narrowed and the function of the eye involved in a peculiar way. But we must leave this and the consideration of the memory, the will power, the motor troubles and the modification of character as among the stigmata of hysteria that deserve to be studied in another paper.—The Clinique.

The Stigmata of Hysteria.—By Dr. R. Ludlam.—Realizing the breadth of his general subject the author has limited this volume to the study of the mental stigmata of hysteria. The diseases of the mind in conection therewith are left for another and a subsequent issue. While in actual practice these two conditions may either be merged or mistaken the one for the other, there is, however, a convenient and practical distinction between them.

Prefaced by a very interesting letter from the late Prof. Charcot, there are five chapters which give the substance of the author's conferences at the Salpêtrière. The first of these is devoted to the different forms of anæsthesia that constitute not only a frequent but also a very important diagnostic symptom of hysteria.—Hysterical Anæsthesia.

## FATAL FEMALE DENTISTRY.

Hiattsville, Kan., May 1.—A few days ago a large, handsome, stylish woman, calling herself Dr. Alberta Oberlin, of St. Louis, came here and advertized to pull teeth without pain. She found five victims, to whose gums she applied a liquid. Soon after the operation the patients were taken ill, their faces and hands became discolored, their tongues swollen and their stomachs affected. One of them is dying, and the dentist has fled.—Pittsburgh Commercial Gazette.

# IS IT AN UNLAWFUL COMBINATION?

In our editorial in the March number of The Digest, which was a reply to an editorial in the February Cosmos, we said in substance that before Dr. Kirk became Editor of the Cosmos nearly all the large dental supply houses entered into a trust; that a dental trust was certainly not organized in the interests of the profession; that, of course, no criticism could be looked for from the journals controlled by the combination, but we thought there were a few journals which would have taken the side of the dentist against this unlawful combination, but if they had done so, the advertisements from the trust would have been withdrawn. We also said that there was a vast difference between a Dental Protective Supply Company, composed of dentists, organized on a co-operative basis for mutual benefit, and in no violation of the law, and a combination or trust, forced to keep the prices up, and so tax the profession.

The reply to this part of our editorial was referred to Mr. Lewis, president of the S. S. White Dental Manufacturing Company. This gentleman accuses us of "attempting to raise the dead by publishing anew that which was shown to be false years ago." The question we raise in this connection is, did they prove the accusations to be false? We have not the article at hand referred to by Mr. Lewis, but from the part that he quotes he shows clearly that some of these regulations are in direct violation of the decisions of the courts. Furthermore, if we are not misinformed, some rules adopted more recently are in still further and greater violation of court decisions, and are such as to have a very decided trust complexion. We may be mistaken about such rules as mentioned being adopted, but we have such evidence in our possession as would be sufficient to prove our position unless other evidence can be shown to the contrary. Will our friend, Mr. Lewis, make public all the rules of the American Dental Trade Association?

We remember seeing a lengthy communication signed by the then president and secretary of the A. D. T. Ass'n., which was sent to the dental profession during the first year of the Association's existence, and which must have been designed to allay or prevent adverse criticism. Both this and the article referred to by Mr. Lewis were looked upon by those who took the trouble to read and think about them, as mere subterfuges. And dentists generally consider it absurd for the A. D. T. Ass'n to attempt to convince them that such an organization was formed for the protection and benefit of the dental profession; they do not question but that this Association, with the additional rules since adopted, was organized to prevent competition, which might lead to a reduction in the price of articles a dentist buys. The opinion often expressed by the profession is to the effect that they have been liberal patrons of these manufacturers who have gone into the trust, and their patronage has afforded large profits; that out of such patronage the supply houses have been able to build expensive factories and buildings, notwithstanding that they have indulged in extravagant methods of doing business; that they (the manufacturers, not the dentists) have grown rich out of the surplus profits, and that it was unfair to the profession for them to have formed such a combination. Therefore, we can assure the members of the A. D. T. Ass'n that the profession is not dead, but sleeping.

Going back to the explanation referred to by Mr. Lewis, which states in substance that not a single article has advanced in price by reason of this Association, he probably does not include teeth under the head of a "single article," but we feel sure that the price did advance from ten to fifteen cents after its organization. It is true that there have been reductions, but they have been forced by outside causes. The drop in the price of teeth from fifteen to twelve cents, just at the time when we were arranging to import the best teeth in the world, would probably be a way to account for this reduction.—Editorial Dental Digest.

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Treatment of Chloroform Asphyxia.—At a recent seance of the Paris Academy of Medicine, reported in the "Bulletin of the Academy," Labbe said that in apparent death from chloroform, he was firmly convinced that artificial respiration should be persevered in for a long time, and instanced many cases in support of this advice, particularly one in which he had kept up artificial respiration for twenty-seven minutes and was finally rewarded with a remarkable success. Lately, however, he had used rythmical traction of the tongue, suggested by M. Laborde, in the case of a child who, soon after beginning the chloroform exhalation, became asphyxiated. Death seemed absolute, the pupils were dilated to the utmost. As soon, however, as he began the rhythmical traction of the tongue, the patient returned to life with marvelous rapidity; it was a genuine resurrection. He believes this method is preferable to artificial respiration, as it is easier and much quicker. Professor Verneuil said that for some time he had used only lingual traction alternating with flagellation of the epigastrium with a wet towel.—Med. Review.

## IMPERIAL PHARAOH NOTHING BUT "DRIED FISH."

Modern irreverence of the "high and mighty" has never been more strikingly illustrated than recently in the custom-house of Cairo, Egypt. We quote from The Christian Herald:

"Brugsch Bey, the famous explorer of the tombs of ancient Egypt, who discovered the mummy believed to be that of the Pharaoh who oppressed the Israelites, recently found another mummy, on the coffin of which was the royal cartouche, indicating that the body was that of one of the Pharaohs. He was delighted with his discovery and with great care packed it up for conveyance to Cairo. On arriving at the railroad station he was directed to have his 'luggage' put in the luggage van. The Bey was concerned about its safety and insisted on its going in the car with him. The officials consented on condition that the fare was paid as for a living passenger. Brugsch Bey according paid Pharaoh's fare and the mummy went in the passenger coach. At the custom-house of Cario a new difficulty arose. The custom officers demanded duty. The Bey explained that the package was the mummy of a Pharaoh and that no duty could be levied upon it. But the officers were convinced that it might be made dutiable under some category, and they searched their lists for a suitable class. Finally, they decided to charge for it as dried fish, on which a duty is imposed. The Bey scorned to contend about the small charge involved, and the mummy having been weighed and the duty paid, the dead body of Pharaoh entered the capital of Egypt as a package of dried fish. With such contempt did they treat the body of a potentate who in lifetime doubtless received the homage of all who came into his presence. In his case with startling force were the words of the prophet fulfilled that the terrible ones shall be despised and shall become as chaff.—(Isa. xxix. 5)."—Literary Digest.

# HORACE WELLS, A DISCOVERER; A SICKLY PLEA!

(From Dental Cosmos.)

"Dr. B. W. Richardson, of England, has in these latter days, and indeed in the past few weeks, in Longman's Magazine, undertaken to tear the mantle from Horace Wells' shoulders and place it upon those of Sir Humphrey Davy. It has been a long period to wait to perform an act of this character; ninety-four years since Humphrey Davy undertook to promote the discovery of Priestly.

"It is pertinent just here to consider what constitutes a discovery. It is certainly true that very few new things are born into the world through the unaided efforts of a single individual. The inspirations, apparently floating through the mental ether of the world, drop here and there as in a parable, some on rocky, some on the poor, and some on fruitful soil. That falling on rocky soil dies in its birth, that on poor soil fails to produce but a weakling, but the third brings forth fruit worthy of the generation. It fell upon Priestly, and there was no germination; on Sir Humphrey Davy, and it ended in a dream; on Horace Wells, and the result was for the comfort and healing of the nations.

"Has this introduction of anæsthesia been of any real benefit to dentistry? I might say almost nothing. To be sure, in the earlier 'duckling' age of this profession, the extraction of teeth was the principle business of the operator; but to-day dentistry has grown far beyond that. We might now follow the old Delphian idea and hang up in our temples—in our operating-rooms and offices—the leaden forceps indicative that no tooth should be drawn until it could be extracted by such an instrument.

"When Dr. Richardson wrote the article alluded to, he very vividly described the condition of surgery just prior to the introduction of anæsthesia. He recalls the feelings of the surgeon, with all the care and anxiety of the day before him; the horror of the students, and the cries of the patients. Is it any wonder that there was intense excitement when the surgeon entered the classroom and announced that there would be no lecture that day, 'that he had a piece of news to communicate—nothing less than the discovery of a method by which the most important surgical operation could be performed while the patient was asleep!' The news had come from Massachusetts Hospital. It is not surprising that the students followed the surgeon to the amphitheatre to see this wonderful operation. Was there one in that excited audience who thought of Sir Humphrey Davy? No, he was entirely forgotten.

"When we contemplate the past history of the world, the horrors of the battle-fields, the terrors of the hospitals, and the accidents of life, the mind falters in its attempt to grasp the aggregate of human misery. Who can translate this into words suitable for comprehension? This wail of the ages was voiced in the Garden of Gethsemane, when the Great Master of human thought, in anticipation of the cruel agonies of the cross, lifted up his voice and prayed, 'Father, let this cup pass from me!' Eighteen centuries passed into oblivion with no response; but near high noon of the nineteenth, in the new world of Columbus, in a humble home in Hartford, there arose a 'still, small voice' sounding above this wilderness of suffering. It was wafted over the deep waters, echoed and re-echoed in joyous aclaim throughout the world: 'Lo, the cry of agony from the surgeon's knife is silenced forever.'

"We cannot deify thee, as the ancient Greeks would have done, but we give thee most hearty thanks, and in our heart of hearts we enshrine thee, O Anæsthesia, goddess of our modern civilization! though not the first-born, the loveliest of all the children of discovery in this our nineteenth century!"

It requires no extra keen perception to discern the motives in such flippant and arrogant statements, and such a pyrotechnic display of verbage in dwelling upon the tooth-pulling act of Horace Wells as an act of the discovery of anæsthesia.

Does not history record the discovery of anæsthesia to the ancients? Anæsthesia designates a physical condition in which the force and functions of life are in continuance. It is a condition of drunkenness in which there is little or no sensation. Anæsthesia may be produced by administering to the stomach or to the lungs, the latter most convenient and effective. Yet this condition for painless surgical operations was produced by administering both to the stomach and to the lungs, by the ancient Assyrians and Greeks administering a decoction of Cannabis Indicus, hyoceamus and Mandragora for surgical operations, amputation of limbs, etc. Then Dr. Morton discovered that this condition could be produced by use of ether. Simpson discovered and brought into public favor that anæsthesia could be produced by use of chloroform. Sir Humphrey Davy discovered that by the use of nitrous oxide gas asphyxia could be produced, during which minor surgical operations could be performed, and he himself submitted to the cutting of the gum grown over an erupting wisdom tooth without experiencing any pain, and then suggested that it might be used thus for minor surgery. Long years after this, Dr. Horace Wells, a very clever dentist of Hartford, Conn., submitted to have the first tooth extracted while asphyxiated with nitrous oxide gas, and then suggested, in common with Dr. Riggs and Prof. Colton, its use for such surgery, and made it somewhat practical. But in the name of common-sense and reason what has this to do with the discovery of the physical condition properly named anæsthesia?

Then again, who ever heard of nitrous oxide gas being used in a practical way in the hospitals for capital operations? If used at all, only in an experimental way and then found to be impracticable and dangerous. Hence, the utter lack of veracity in the pyrotechnic "Lo, the cry of agony from the surgeon's knife is silenced forever" by nitrous oxide gas.

More appropriately the writer should have said, "Thou demon of asphyxia, thou devitalizing monster, thou dare-devil in the jaws of death, be thou banished from the soil of civilization; thou can'st not produce anæsthesia; thy mission is to devitalize, to deoxidize the blood, to pluck the rosy tint from the flowers of human life and strew thy pathway with the victims of thy barbarous deeds."

The eminent Dr. Richardson, than whom there is no higher authority in Europe, says of nitrous oxide gas (this pet of the Dental Syndicate) that "its use for the pretended purpose of producing anæsthesia should be prohibited by law."—Editor.

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Dr. H. M. Brown, of Ashtabula, Ohio, says the dental law of that State was changed six years ago, as follows:

The members of the Dental Board are appointed for three years. Any person having a diploma from any reputable dental college shall file it with the Secretary of the Board, and appear before the board for examination and license, and pay ten dollars, and produce satisfactory and reasonable proof of the fact that he holds such diploma, or has been engaged in the practice of dentistry in this State since July 4th, 1889. Then he shall receive a certificate of registration and license to practice dentistry in this State.

# HYPNOTIC SUGGESTIONS AS AN OBTUNDENT AND SEDATIVE.

It has fallen to my lot, I believe, to first observe that suggestions made to a patient during the wakeful state and during the light degrees of hypnotic sleep are sufficient to produce insensibility in dentine, and also the first to demonstrate its application to the practice of dentistry. Many years ago it was demonstrated that in the very deep hypnosis which obtains with a very small percentage of patients, the anæsthesia was sufficient to operate on sensitive dentine without pain to the patient, to extract teeth, and to perform minor and major surgical operations without the patient's knowledge. But I know of no record that suggested anæsthesia during light hypnosis which leaves the consciousness unaffected and the mind alert that has ever been made useful and available as a dental obtundent. In March, 1892, I accomplished this, and in April announced the discovery to the American Academy of Dental Science, Boston, and in the following June I read a paper upon the subject before the Massachusetts Dental Society, which was subsequently published in the Dental Review, September, 1892.

For thirty years I have been familiar with the remedial effects of hypnotic suggestion, and was fully convinced that hypnotism would be eventually made valuable for use in dentistry, but it was not until I had made Bernheim's Suggestive Therapeutics an object of thorough study and reflection that the way opened for me to apply it for this purpose. My successful results were a joyful surprise to me, and have proved a great solace and relief to my patients since. And with me it is at the present time a well-recognized resource of relief for hypersensitive patients and a reliable obtundent for sensitive dentine. By its use I have rendered painfully sensitive dentine anæsthetic and formed the cavity to my full satisfaction, all the while the patient being fully conscious of all that was going on and fully realizing the obtunding effect of the suggestion

The sedative effects of suggestion have also proved most salutary and efficient, and in most cases relieving the patient entirely of the terror which is so often the greatest hindrance to a successful operation. Patients who for years have been unable to sit in a dental chair have had their fears removed, and repeated operations performed without suffering, and at the close of each sitting have left the chair in a better condition, mentally and physically, than after the previous visit. A case in my practice this spring well illustrates the sedative and assuring effect of hypnotic suggestion.

A lady about fifty years old, had, when a young girl, a pulp exposed, and her dentist had sought to remove it by immediate operation without any obtundent. The shock nearly paralyzed her. She said that for a few moments she thought she was dead. Since then she has suffered such terror that it has been almost impossible for her to have any dentistry done, being ill after every visit to her dentist. Consequently she had lost many teeth, and needed much crown and bridge-work, and also several fillings. Knowing of my success with suggestion, she came five hundred miles to experience its benefits. She sat down in my operating-chair dejected, depressed, terror-stricken, her extremities cold. Cold perspiration was standing out on her forehead, and her pulse rapid and weak. I hypnotized her in the first degree, and suggested relief, and in five minutes all fears were removed, her physical functions were restored to their normal condition, and she was enjoying a sense of comfort, and able to bear the grinding of teeth with a corundum disk without disturbance; and by sucessive repititions of the hypnosis and suggestions she was able to occupy my chair over twenty-one hours within six days and improve each day, and on her return was able (as she wrote to a friend), "to at once answer her accumulated correspondence, instead of (going to bed, as usual, after a dental operation."

At one sitting she wished me to examine a tooth. As it was pulpless and not sore, I thought to examine it without hypnotic suggestion; but, as I had not suggested as to this special tooth, her old terror returned and she was utterly unable to let me proceed. I hypnotized and suggested relief, and her fear was gone, and I completed the examination without trouble.

One other case illustrates the lasting effect of suggestion over fears of more recent origin.

A young lady, twenty-two years old, had, a few weeks before her visit to me, undergone an attempt made to extract a tooth. The operator did not succeed in removing the tooth, but persisted in his efforts until the patient was partially unconscious.

The result was a state of great fear, which nearly disabled her during the day, and rendered much sleep at night impossible. As soon as she would fall asleep the horror of some one wrenching at her tooth would bring her sitting upright in bed. She persisted she never could have her teeth touched again, or again take an anæsthetic. Her sister finally persuaded her to see me, promising that I should do nothing without her asking. I talked with her awhile, when she consented to be hypnotized. She hypnotized quite deeply—memory gone. I suggested removal of fears and a willingness to take some ether, and absence of any dread of the extraction of the tooth. In five minutes I woke her, and immediately after answering me a question said, "I will take the ether." I immediately prepared the ether-sponge, hypnotized her again, and suggested comfort during the inhaling of the ether. I carefully administered it while she was still hypnotized. She did not seem to experience the slightest discomfort. I extracted the tooth readily, and the patient recovered without terror or distress. Before I discharged her, I hypnotized her again, and suggested good sleep without dreams or fears for the coming night. She returned home, and during the night and next morning enjoyed a peaceful, restful sleep of twelve hours, waking only once during that time. She was hypnotized again the next day, and good sleep, undisturbed by terror of dreams has been her experience ever since.

The following illustrates the effects of suggestion upon another class of cases. A married lady, about thirty-five years old, has been a sufferer for many years with rheumatism, and is consequently considerably reduced in physical strength; her nervous system has suffered especially. Her teeth have been extremely sensitive; consequently without any special or sudden shock she had come to find it impossible to have any dental operations performed, and for two years her teeth had been entirely neglected. She came to me last autumn, hoping for relief. She sat down in my operating-chair in a state of great trepidation, trembling and perspiring. She was too much excited for me to attempt to even partially hypnotize. I simply placed my hand on her forehead and requested her to close her eyes, and then audibly suggested quiet, rest, absence of fear, and confidence. In five minutes she was entirely calm and quiet. I here further suggested anæsthesia of the teeth, and was able to excavate two cavities and fill with gold at this sitting, and a number more at subsequent sittings. At the close of the last sitting the patient was in a very much better condition than at the close of the first visit.

This patient I was unable to hypnotize by aid of fixation of the gaze, but by the repetition of the method first employed I was able to produce a suggestible condition that maintained anæsthesia of the teeth and a state of comfort for the patient and "a complete feeling of I don't care," as she expressed it.

As I have longer practiced hypnotizing patients, I find a larger number who are better and more deeply affected by this method, and I am inclined to think that the fixation of the gaze which is so much depended on will cease to be considered so essential as at present.

These three cases are typical; they are epecially favorable and among my most successful. Still, I have a large number equally so to keep them company. Suggestion is not a "cure-all." Some patients cannot be made suggestible. The teeth of some patients who are hypnotized cannot be anæsthetized. One patient I have is a lad of fifteen. He hypnotizes to a state of deep somnambulism every time; the loss of memory is so complete that he has never remembered anything that I have said or done during the hypnosis, and feels exultant that he has had his dentistry done without suffering. Still I have been unable to render the dentine scarcely less sensitive apparently than when awake, and he shrinks nearly as much. This case is entirely exceptional.

While suggestion is not of universal application, yet summing up the favorable effects of the sensitiveness of the dentine it proves for me the most efficient dental obtundent that it has been my privilege to try. In my paper referred to, I reported an analysis of twenty-one cases showing my success. My subsequent experience has fully corroborated this favorable showing. The number of patients was twenty-one; one failed to hypnotize, consequently the summary applies to twenty patients. Full anæsthesia of the dentine obtained twenty-one times for eight persons, or forty per cent. of the whole number of patients. Anæsthesia of dentine not quite complete, but practically successful, twelve times for seven patients, being thirty-seven per cent. of the whole number of patients. Anæsthesia completed with local obtundents six times to five patients, or twenty-five per cent. of the patients.

I had successfully applied suggestion once for removal of necrosed bone, five times for extracting teeth, one tooth at each operation. Once for operation on alveolar abscess. For removal of dread of taking gas, twice, once sucessful and once unsuccessful. I have many times and uniformly since removed all dread of anæsthesia, and also prevented the nervous fear that is likely to obtain when waking up.

It is impossible to indicate in any table all the benefit that accrued to the patient from hypnotism. In every case there was almost complete, and in some cases, entire relaxation of nervous and muscular tension, so that the patient rested during the operation instead of being exhausted. Almost every person left my operating-chair saying that he felt better than when he sat down. I always suggest that the patient is resting, will wake up freshened, and this result usually follows. If by chance a different result obtains, I at once hypnotize again and correct the error. This has occurred in a few instances, but thus far I have not failed to relieve the discomfort.

Another distinct gain has been described by several patients independently, viz.: When any pain is felt, it is sensed only at the point of contact with the insrument, and not over the whole system, as is generally the case. If a tooth is extracted, there is no dread felt before the operation nor shock produced by it, only a little twinge felt the instant the tooth is being pulled. A worthy Scotchman expressed himself to the point after having a tooth extracted under hypnotism, "I rather think it helped me; it kind of reconciled me down to it."

The operation for necrosis mentioned was for a patient whose nervous system was much broken down; any excitement from sorrow, fear, or joy would invariably cause her several hours of nervous excitement and distress, entirely disabling her at the time. The hypnosis prevented any unfavorable results from the operation. I do not presume to rely on suggestion as an anæsthetic for the exraction of teeth. I occasionally try it for one single tooth, and if the patient willingly opens the mouth and submits to the operation, I feel sure of success. I have never tried it for more than one tooth at a time.

The Caucasian race in the temperate zone does not seem to hypnotize as deeply nor accept the suggestion as implicitly as do the Eastern races of the torrid zone. Still I find many patients suggestible without any attempt at hypnosis, so that by simply verbally assuring the patient that the dentine is anæsthetized, it can be cut without the patient suffering. By the same means fears will be removed, the palpitating heart stilled, and a feeling of repose and quiet made to succeed a storm of excitement. In one case I reduced the pulse twelve beats in less than three minutes, and removed just as quickly what seemed insuperable fear of an anæsthetic. This is only a repetition of similar experiences of other hypnotists; it is only utilizing one of the elements of the human mind which has come to be well understood by all students of mental philosophy. The power to use this agency of suggestion either in a wakeful or hypnotic state is not, as may be supposed, confined to a few, nor is it any special gift; it is one of the faculties of the mind, and much in the same sense as is the mechanical, mathematical, literary or artistic ability.

The average man can become a capable hypnotist, and at least three-fourths of the practitioners of dentistry may by proper study and application make it exceedingly useful. I had occasion recently to instruct some young dentists in the art of hypnotizing; six sat down, two at a time as subjects, and another six became operators. Four of the operators were entirely successful, and fully hypnotized their subjects. The last two failed of complete success for lack of time, which caused a hurried feeling which is inimical to any approach to the hypnotic condition. Any one of good understanding and of fair ability can use the elements of suggestion in a form taught by the Philosophy of Repose or the so-called devitalizing process. Several of my patients have attained to the power of auto-hypnotization by the practice of those methods, and have rendered their dental operations completely painless. Also some of my professional friends have found themselves able to give their patients great relief by suggesting this method while operating on their teeth.

There is no fear among patients or operators to prevent the practice of this, and it will eventually prepare the way for the more potent suggestion under the hypnotic condition. At present, prejudice and fear begotten of ignorance and misinformation prevent the dental profession from obtaining the benefits following the use of hypnotic suggestion. Consequently it is fortunate so much benefit can be obtained by the less-pronounced forms which commend themselves to the most timid.

The fancied dangers attending hypnosis have a great influence in preventing its use. The real dangers are few and wholly avoidable. Liebault says, "The accidents in hypnotism are wholly due to the ignorance or giddy tricks of the operator." And Moll affirms, "It is insufficient technical knowledge that is dangerous, not hypnotism. Hypnotism properly used is as harmless as electricity properly used." No danger or ill effect ever accompanied or followed its administration by a reasonably competent and honest operator.

The condition itself is not in the least dangerous. The patient is put to into a quiet sleep, being light or deep as the susceptibility of the subject may determine. The patient is comfortable and resting, and if left alone will usually in fifteen or twenty minutes wake spontaneously as from natural sleep. The hypnosis wears out. The patient may feel drowsy for some time longer, but soon returns to the former condition of wakefulness, but the quiet, calming influence of the hypnosis is sure to remain.

No sensible man will deny that harm may be done with hypnotic suggestion. There is "nothing good under the sun" which may not do harm or become evil by misuse. The commonest blessings of air, water and warmth become in the tempest, the flood and the conflagration the greatest evils. Nutritious food becomes a bane to the overloaded stomach, and heat and moisture produce a pestilence from the bounteous products of the soil.

Anæsthesia often produces direful results, yet it is a wonderful blessing, so like Juliet's wine that,

"Through all thy veins shall run,
A cold and drowsy humor, which shall seize
Each vital spirit; for no pulse shall keep
His natural progress, but surcease to beat;
No warmth, no breath, shall testify thou liv'st;
The roses in thy lips and cheeks shall fade
To paly ashes; thine eyes' windows fall,
Like death when he shuts up the day of life;
Each part, deprived of supple government,
Shall stiff, and stark and cold appear like death;
And in this borrow'd likeness of shrunk death;
Thou shalt remain full two and forty hours,
And the awake as from a pleasant sleep."

In predisposed cases chloroform, ether and gas have caused sickness, insanity and death. Yet every surgeon uses them, and every patient expects and desires them. Opium and alcohol are also dangerous, a thousand times more dangerous than suggestion. They do their evil when used for good purposes by innocent and well-intentioned persons, and have usually done their work before the victim or physician is aware of it; but hypnotism can do no harm unless the ill result is carefully planned and knowingly and deliberately brought about. An operator that could do this is basely vile, and can hardly be found in any branch of the medical profession.

Suggestion will cure headache, and will also cause it. Suggestion will relieve tonic contraction of the muscles, and it will also cause spasms of the same organs. Suggestion will stimulate to elevating thoughts and mental activity, and it will induce mental inactivity and excite debasing imagination. It has been said hypnotism ought not to be used until better understood. Upon that premise no man could think another thought. For there is no understanding often how a thought is produced, nor do we understand any mental process; we only know what we observe of the mental phenomena.

No competent operator need have any fear for himself or his patient. Average ability, fair knowledge of the subject, and honetsy are sufficient safeguards for both the operator and his patients. It is said the rash, foolish and unprincipled may abuse it. True. But this is all the more reason why the conservative, wise and high-minded physician would snatch it from such unworthy hands.

I do not believe in letting the devil have a monopoly of all the valuable things in his hands.

Not many years ago anæsthetics were used to make ludicrous exhibitions of persons for public entertainments; yet no one on that account refuses to use them to assuage the agonies of a painful operation.

The rash, foolish and unprincipled have used hypnotism for many years, and to-day use it to make amusing and profitable entertainments; but this is no reason why suffering humanity should be denied the blessing of the remedial effects of this wonderful curative agency. To me it is a wonder that fifty years ago scientific men should have been so blind as to have given it over so completely into the hands of the unprincipled and uneducated classes.

While it is true that extreme cases have been found where control was obtained and violence done to the subject, it must be remembered that the patients in every case know what is said and what is done, and also what they do. In a few cases only the memory does not bridge over from the hypnotic condition to the wakeful state, or the conscious self does not take sufficient cognizance of what is said and done to receive the impression. Now, as the somnambulistic state obtains in hardly one patient in ten, it would require a hardihood beyond compare or an ignorance beyond conception to presume upon it.

The propriety of witnesses being present when the operator and patient are of the oposite sex, no one will question; but the necessity of it is greatly exaggerated. Nearly ninety per cent. of the patients are protected by their exalted perception and full consciousness, and the rest by the utmost certainty of being aroused by any suggestions against their convictions. In the exceptional cases, the operator needs the witnesses for his own protection against designing patients, rather than the patient against him.

It is generally considered that hypnotism is not the best name for the suggestible condition which we are considering, but it has become so firmly fixed that it is useless to attempt any change or substitution.

Generally persons do not sleep in the ordinary sense of being unconscious, as in sleep at night. In the hypnotic condition the patients are fully conscious, their faculties are keenly alive, and their perceptions more acute than when in their usual wakeful state. Still the conditions of the nervous system are radically different.

We have said hypnotism is a misnomer, yet no one has suggested a better name. We call it sleep to induce it, and we call it sleep to continue it, and we call on the patient to wake when we wish to terminate it; hence it must be considered sleep, though in most cases not inappropriately conscious sleep. It has the quality of sleep.

The induction of hypnosis is a simple and easy matter. I use the method which has proved so successful with the Nancy school, and described substantially as follows by Bernheim:

"When I have banished from the patient's mind the idea of hypnotism and the somewhat mysterious fear that attaches to that unknown condition, above all when he has seen patients cured or benefitted by the means in question, he is no longer suspicious, but gives himself up. Then I say, 'Look at me and think of nothing but sleep. Your eyelids begin to feel heavy, your eyes are tired. They begin to wink, they are getting moist, you cannot see distinctly. They are closed.' Some patients close their eyes and are asleep immediately. With others, I have to repeat, lay more stress on what I say, and even make gestures. It makes little difference what sort of gesture is made. I hold two fingers of my right hand before the patient's eyes and ask him to look at them, or pass both hands before his eyes, or persuade him to fix his eyes upon mine, endeavoring at the same time to concentrate his attention upon the idea of sleep. I say, 'Your lids are closing, you cannot open them again. Your arms feel heavy, so do your legs. You cannot feel anything. Your hands are motionless. You see nothing, you are going to sleep,' and I add in a commanding tone 'Sleep.' This word often turns the balance. The eyes close, and the patient sleeps or is at least influenced."

Many persons, as above stated, are influenced at the very first seance, others not until the second or third. After being hypnotized once or twice, they are speedily influenced. It is often enough to look at patients, to spread the fingers before the eyes, to say, "Sleep!" and in a second or two, sometimes instantly, the eyes close and all the phenomena of sleep are present. It is only after a certain number of seances, generally a small number, that the patient aquires the aptitude for going to sleep quickly.

Some people can be hypnotized with chloroform before they are really under its influence. All surgeons have seen patients go to sleep suddenly without any period of excitement, after a few breaths of the anæsthetic, and before it certainly has done its work. In some cases the hypnotic sleep thus comes before the anæsthesia. If it is deep enough to cause complete anæsthesia, as I have seen it, the operation can be performed without delay; if not, I keep on giving chloroform until the anæsthesia is complete, which takes place more rapidly because aided by suggestion. By acting in this manner I also prevent the period of excitement in these cases.

It is wrong to believe that the subjects influenced are all weak-nerved, weak-brained, hysterical, or women. Most of my observations relate to men, whom I have chosen on purpose to controvert this belief. Without doubt, impressionability varies.

Common people, those of gentle disposition, old soldiers, artisans, people accustomed to passive obedience, have seemed to me, as well as M. Liebault, more ready to receive the suggestion than preoccupied people, and those who often unconsciously oppose a certain mental resistance. The idea of being hypnotized must be present; the patient must submit entirely to the hypnotizer, using no cerebral resistance; then, I repeat, experience shows that a very large majority of people are easily influenced.

I have, I believe, verified all the phenomena observed by Bernheim as to symptoms of hypnosis, and nearly all of his variations of methods includes it. I, myself, use my eyes more for a fixed point for the patient's gaze than the fingers. I find it more agreeable to the patient. It seems to them more sensible, and unless the operator is likely to be hypnotized himself it is, I think, the better. Laying my hand on the forehead and over the eyes to close them, and exclude the light, is very successful with me and much preferred by many, and very often is more effectual. In these cases audible suggestion is used, same as in others.

I find the fixation of the gaze much less necessary than formerly, and now by no means essential. The awaking from the hypnotic sleep may be instantaneous. In my experience the patient will wake up from light sleep any time when I leave him for a moment, unless I particularly suggest a continuance of the sleep; but the majority of subjects left to themselves sleep on for several minutes, for a half-hour or even for one or more hours, when the sleep will terminate spontaneously.

For most patients the simple suggestion "Wake up" is quite sufficient to terminate the condition. Occasionally it may need to be repeated perhaps a little more emphatically. If the arousing is sluggish, fanning or blowing on the face is useful, with the command "Wake up" repeated. A slight shock, or a slap on the arm, will quicken the termination of the condition. No hypnotist of good technical knowledge has ever had any difficulty in arousing the patient from the hypnosis at will.

An important question for dentists is: How to maintain the hypnosis and induce the anæsthesia of the dentine while operating on the teeth?

I have found that all writers upon the subject, as far as I could learn, state that pain would always wake the patient from the hypnotic sleep, unless such patient was in a somnambulistic condition. I felt it might be possible to derive distinct benefit in the lighter stages if they could be kept continuous. I soon believed it possible, and after dilligent study I commenced to hypnotize, and my first effort proved a success, the patient reaching the second stage. And then I made the discovery that continuous suggestion makes it possible to keep a patient hypnotized, and the dentine wholly or partially anæsthetized for a full preparation of the cavity during the light sleep of the first and second degrees. I am not aware that this has ever been made successful before.

I maintain the hypnosis and the anæsthesia by a constant repetition of "Sleep, sleep; you are resting, you are not suffering, you are not dreading it, you do not care for it, sleep, sleep," and so on continuously as long as the condition is desired. It is practically a continual re-hypnotizing to offset the continual waking caused by the cut of the instrument..

Sometimes the hypnosis will wear out in spite of continual suggestion, especially if the operator's attention is too wholly absorbed in the operation, and his suggestions become weak. In such a case I stop and hypnotize again. I have hypnotized as many as six times at one sitting.

If the sitting is long and the hypnosis deep, the patients are likely to get tired, and I have found it better to wake them up at intervals for rest, or suggest a change of position, but the waking is much better. By making this conservative use of hypnotism, the patient in every instance will feel rested and stronger at the close of the siting than before, and will improve in courage and quiet as the sittings succeed each other, and in many cases the need of hypnotism will cease to exist and the patient submit to the operation in the wakeful state without shirking.

I had a case lately that illustrated it. A girl fourteen years old had feared dental operations so much that for two years she has not been able to have her teeth even cleansed. Hypnotism made cleansing, preparing and filling easy, and at the fourth sitting she had become so indifferent that she was quite willing to have a large cavity in a molar prepared and filled while fully awake. Others have experienced the same benefit.

These results have, it seems to me, proved that in my hands hypnotic suggestion as a sedative and as an obtundent, is a marked success; and I believe equal and greater success may be achieved by many other operators when they make intelligent effort to accomplish this desired end.

The physiology of any mental state or mental action is but little understood beyond a familiarity with the phenomena displayed. We are no better nor worse off with the hypnotic condition. The phenomena of hypnotism has been observed scientifically for more than one hundred years, and many facts established.

Mesmer, in 1778, announced the discovery of producing this condition at will, and announced his theory of animal magnetism.

In 1841 Dr. James Braid described this mesmeric state, and called it hypnotism, and placed the subject on a truly scientific basis, and definitely established the fact that suggestion was the sole cause of the condition.

Braid proved that no magnetic fluid exists, and that no mysterious force emanates from the hypnotizer. He further proved that the hypnotic state and its associated phenomena are purely subjective in their origin; and this origin is in the nervous system of the subject himself.

Braid's suggestions were based upon the expectancy of the patient; hence there was less certainty of benefit than exists at the present time.

In 1860 Dr. Liebault, of Nancy, commenced the use of hypnotism, and soon discovered that audible suggestions addressed to the patient heightened the effect and made the results more uniform and certain.

This is now almost the universal practice. It seems established that hypnosis is entirely free from danger, and its effects upon the patient if left undisturbed are the same as ordinary sleep.

The great essential feature of hypnotism is not sleep, but a heightened receptivity of suggestions with or without sleep; in other words, any suggestion offered to a person during hypnosis has an exaggerated effect on the mind. But up to a certain point, that of lethargy, the deeper the sleep the greater the effect of the suggestion.

In hypnosis the power to imitate any volition is in abeyance. The mind will be directed from the old channels and follow a new line of thought; it will exert its physiological force as directed by the operator.

The mind seems to become non-resistant, and old thoughts are held in abeyance, and new thoughts are suggested and received to hold control, so that sometimes during a single hypnosis a condition directly opposite that to which previously existed may gain permanent control. Courage may succeed fear, rest replace fatigue, and sweet, natural sleep come to the patient instead of wakeful hours of restlessness.

Liebault's idea is that "ordinary sleep does not differ from hypnotic sleep. The one is, like the other, due to the fixation of the attention and of the nervous force upon the idea of sleep. The individual who wishes to sleep isolates his senses, meditates, and remains motionless. The nervous force concentrates itself, so to speak, at one point of the brain upon a single idea, and abandons the nerves of sensation, motion, and special sense.

"But the ordinary sleeper is in relation with himself only, and as soon as consciousness is lost, the impressions conducted to his brain by the nerves of sensibility, or of organic life may awaken diverse memory-sensations or images which constitute dreams. These dreams are spontaneous, that is to say, suggested by himself.

"The hypnotized subject falls asleep, with his thoughts fixed, in relationship with the hypnotizer; hence the possibility of the suggestion of dreams, ideas and acts, by this foreign will."

I close this part of the subject with a statement of the theory of Despine, which seems to me founded upon clinical observations. "There exists," says this author, "an automatic cerebral activity which manifests itself without the occurrence of the ego; for all nervous centers possess in accordance with the laws which govern their activity an intelligent power, without any ego, and without personality. In certain pathological cerebral states the psychical faculties may manifest themselves in the absence of the ego, of the mind, of consciousness, and may give rise to acts similar to those which normally are manifested through the agency of the ego. This is automatic cerebral activity. That which manifests the ego, on the contrary, is conscious cerebral activity. In the normal condition, these two activities are intimately bound together, they are but one, and always manifest themselves conjointly; in certain pathological states they may be separated and act alone. Hypnotism is characterized physiologically by the exercise of the automatic activity of the brain during the paralysis of its conscious activity."

(To be continued.)

# CHAPIN A. HARRIS MEMORIAL FUND.

Baltimore, May, 1895.

To the Dentists of the United States:—

A movement is now in progress to insure the mortuary tribute to the memory of one of the greatest names in the annals of Dentistry. It is proposed to adorn his neglected tomb at Mount Olivet Cemetery with a monumental testimonial worthy of his name and fame.

Mr. Ernest W. Keyser, the talented Baltimore sculptor now in Paris, has modelled a remarkably faithful portrait bust of Dr. Harris and executed designs intended for a monument to be erected over his grave.

It is also in contemplation that should sufficient funds be realized a memorial tablet containing an alto relievo bronze bust of Dr. Harris be placed in both the Baltimore College of Dental Surgery and the Dental Department of the University of Maryland.

It is believed that the necessary funds can be obtained through voluntary subscriptions from the dental profession. Snowden & Cowman Manufacturing Company, of Baltimore, has kindly consented to act as custodians of the "Harris Memorial Fund." Contributions are earnestly solicited and will be thankfully acknowledged.

Address: Snowden & Cowman M'f'g Co.,
9 West Fayette Street,
Baltimore, Md.

Dr. Chapin A. Harris was born in 1806 at Pompey, Onandaga County, New York. He studied medicine, removed to Ohio and afterwards settled in Baltimore, Md., where he practiced dentistry until his death in 1860. He founded and assisted in the organization of the first dental college in the world—"The Baltimore College of Dental Surgery"—chartered in 1839. Was for many years its Professor of Dental Surgery. He edited the American Journal of Dental Science, the first of its kind ever published, from 1839 until 1860, the year in which he died—and was a voluminous contributor to other dental and medical journals. He was the author of "Principles and Practice of Dental Surgery," "Characteristics of the Human Teeth," "Diseases of the Maxillary Sinus," "Harris' Dental Dictionary," and edited "Fox's Natural History and Diseases of the Human Teeth," with additions, etc. These books were and are widely known to the civilized world.

In 1892 Dr. S. J. Cockerille, of Washington, D. C., delivered an address before the Virginia State Dental Society, from which the folowing excerpts are quoted: "The time arrived when dentistry demanded an honorable place among her sister sciences, and the Baltimore Dental College sprang into existence as the natural fruit of Harris' earnest and protracted labors." "He was the first to teach that the attainment of excellence in all things connected with dentistry is not only a high moral and personal duty but is likewise an obligation imposed by the community whose bounty is enjoyed." "Considered simply as a dentist Harris was a genius." "He devoted his life to the earnest study of medical and scientific literature." It would be difficult to overestimate the value of the services which he rendered to the cause of higher education. Every lover of dentistry owes a distinct debt of gratitude to the man." "His rule of conduct was to keep his mind unbiased by theories and speculations; never to have any wish that an investigation should result in favor of this view in preference to that, and never to attempt by premature speculation to anticipate the result of investigations but always to trust to the investigations themselves." "Harris was a hard worker and devoted all the resources of his cultivated mind to further the welfare of his profession." "With the students he was punctual, truthful, straight-forward, industrious and always kind." "In his family he was forbearing and loving to his children; to his wife he was the perfection of purity and devotion." "He was more than a dentist—he was a Christian gentleman."

"Honor his memory; keep it green in your hearts and hand it down to your children and children's children to the remotest generations, making the profession a blessing to them." "We expected the great State of New York to step forward and do justice to her noblest son; she failing, we turned with anxious eye to his adopted State, the State that gave to the world its first Dental College, but we have waited in vain." "Let not the names of our great and useful men pass into oblivion."

From the manner in which this commendable effort of 1895 has already been received we feel confident that it will be successful, and we earnestly call upon the members of a profession to which Chapin A. Harris was so warmly devoted, and for which he did so much during the greater part of his earthly career, to aid in this movement by contributing according to their ability. It would require but a small sum for each of the thousands of practitioners of dentistry in this country, all of whom must acknowledge that to Chapin A. Harris is due the honor of having been among the first to rescue dentistry from the condition of a mere trade, and to elevate it to its present status. Let all of us, therefore, unite in preserving the mortal remains of Chapin A. Harris from oblivion, and honor his memory by placing enduring tablets in the two Dental Colleges of Baltimore, one of which was established by his individual efforts, and the other through his teachings.—F. J. S. G.

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Yes, it is considerable trouble to finish alloy and gold filling exquisitely, yet it pays. It is better for the filling and for our reputation. Patients like this extra attention. They like "the feeling of it," and they take pride in showing its beauty, and this lustre reflects back on us. Then, too, if we finish work with precision and taste, we soon beget the habit of doing the whole work with exactness and skill. I hope some careless workman will read this and take a hint.

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Are we not killing too many pulps of teeth? Where inflammation and maturation have destroyed a portion there may be reason for extermination, but where the pulps are comparatively healthy they may be saved. The excuse is often made that the process is too painful and uncertain. But pain is unnecessary, and with intelligent manipulation success is generally assured. We fear, many of us do what is the easiest, and what will better please our patients, who often want to escape trouble.

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## TO LICENSEES.

It is due to the *Licensees* of the *Hayes Process of Anæsthesia*, that we make known to them that in the *use* of Hayes Hypnotic up to date by this Process at our recent estimate of the amount consumed, estimating for dental operations and minor surgical operations an average of 75 patients to the lb., that at least about 400,000 patients have been anæsthetized and that in the use of Chlorolene on the same base about 125,000 patients have taken it, making a total of about 525,000 patients without causing a single death. Besides some of our Licensees have used Chloroform, others Ether, and still others the A. C. E. mixture, without causing a death. This is a marvelous record of safety and speaks in silent language for the inestimable merits of this Process as well as of these liquid narcotics.

These liquids are now shipped in cans.

HAYES DENTAL AND SURGICAL MFG. CO.

# DEATH FROM NITROUS OXIDE.

It is the forgetfulness or ignorance of the possibility of accident that leads another to take wise precautions, with now and again a lamentable result. Such an untoward result it is our painful duty to record this month, and as we do so, the fact suggests itself that it comes as a ghastly commentary on our remarks on "Failures" in the last issue. Here is a failure of a serious kind. What can we learn from it: Condemnation of the administrator of the gas? Certainly not! "Let him who is innocent cast the first stone." Rather let us consider the cause that it may help us to avoid a like result in the future.

In Dr. Hewitt's excellent book, "Anæsthetics and their Administration," the dangers connected with the administration of nitrous oxide are conveniently grouped under four headings. 1. The administration of an overdose. 2. The passage of foreign bodies into the larynx or trachea. 3. Respiratory failure occurring independently of the causes referred to in 1 and 2. 4. Circulatory failure: Syncope. Of these the second and third groups are by far the most frequent cause of trouble during nitrous oxide anæsthesia (asphyxia—Ed.) and are, at the same time, due to causes for the most part preventable. Heart failure as a primary phenomenon is rare, thus Dr. Buxton states: "Whether death from syncope has ever taken place under nitrous oxide is doubtful;" whilst Dr. Hewitt has been "unable to find any reliable account of grave or fatal syncope from imperfect anæsthesia (asphyxia—Ed.) under nitrous oxide." But weakly and old people with feeble or diseased hearts it must be perfectly obvious that the extra strain coincident to respiratory obstruction may in many cases lead to fatal syncope. But the stoppage of the heart being in these cases secondary to the respiratory trouble, it is evidently possible that, if we can prevent the latter, we may hope not to be troubled by the former.

This case under discussion may be briefly described. The patient was a girl, age twenty-three, who apparently appeared to the administrator to be in perfect health; gas was administered, a tooth was extracted and the patient recovered consciousness (therefore obviously not an overdose), but remained in a listless condition. Shortly, however, she commenced breathing in a spasmodic way, there was lividity around the nostril, and in spite of every aid in about an hour she was dead. Measurement showed her stays to be five inches smaller than her waist, and her internal organs showed that tight lacing had been habitual. In the account to hand, there is much omitted that we should have been glad to learn, but even from this each will see how the respiratory movements must have been impeded by a corset of this description. Unfortunately, as a sequence of events, this case does not stand alone, for it will be remembered that a fatality under similar circumstances happened at Edinburgh, in 1889, the patient being a lady of rank. Here, then, we have two cases of death due in the first instance to respiratory failure, the result of tight-lacing. Surely they teach a lesson. It would seem as if this impediment to respiration escaped notice, yet it is one which should be apparent. We take it that no man would think of administering gas without first examining the mouth to see if there be any actual or potential impediment to respiration therein. He should also be careful to see whether there be any obstruction to the respiratory movements of the thorax, especially tight corsets. It would be a useful rule to always see that they are undone, nor need there be any indelicacy about the matter, especially if the patient be requested to take her seat in the chair, and then be covered over with a large towel or one of the waterproof aprons specially made for this purpose.—Editorial, Dental Record.

The above is but another illustration of the flippant and irrational statements as to the cause of death in the use of nitrous oxide gas. This time it is tight lacing that is assigned by the organ of the Dental Trust. But what dentist does not know that if a patient did not breathe at all she would not live as long as if she breathed nothing but nitrous oxide. Then if this be true, how can it be possible that tight lacing could have been the cause of the death?

Unfortunately the blood was deoxidized by the administration of the gas, and thus impoverished, the nerve force proved to be inadequate to sustain life, and she died from this effect, and not from tight lacing.—Editor.

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Of all pauperism, the most degraded and degrading, because utterly shameless and thriftless, is that aristocracy which idly luxuriates in money obtained through speculation, extortion or inheritance.

## DENTAL COLLEGE STUDENTS AND GRADUATES.

The following table gives the total number of matriculates for the year and the graduates at the late commencements of the following colleges:

| | | | | |
|---|---|---|---|---|
| Birmingham Dental College | Matriculates, | 24 | Graduates, | 1 |
| University of California | " | . | " | 38 |
| Columbia University | " | 64 | " | 15 |
| National University | " | 36 | " | 9 |
| Howard University | " | 11 | " | 0 |
| Southern Medical College, Dental Department | " | | " | ... |
| Chicago College of Dental Surgery | " | 416 | " | 107 |
| American College of Dental Surgery | " | 331 | " | 16 |
| Columbian Dental College | " | | " | .. |
| Northwestern University, Dental School | " | 118 | " | 30 |
| Indiana Dental College | " | 126 | " | 27 |
| University of Iowa | " | 150 | " | 25 |
| Louisville College of Dentistry | " | 129 | " | 26 |
| University of Maryland | " | 180 | " | 45 |
| Baltimore College of Dental Surgery | " | 166 | " | 45 |
| Harvard University, Dental School | " | ... | " | ... |
| Boston Dental College | " | ... | " | . |
| University of Michigan, Dental Department | " | 184 | " | 47 |
| Detroit College of Medicine, Dental Department | " | 54 | " | 18 |
| University of Minnesota | " | 70 | " | 12 |
| Missouri Dental College | " | 86 | " | 24 |
| Kansas City Dental College | " | 153 | " | 39 |
| Western Dental College | " | 163 | " | 30 |
| University of Buffalo | " | 160 | " | 30 |
| New York College of Dentistry | " | 364 | " | 82 |
| Ohio College of Dental Surgery | " | 189 | " | 50 |
| Western Reserve University | " | 53 | " | 17 |
| Cleveland University | " | 27 | " | 5 |
| Cincinnati College of Dental Surgery | " | 25 | " | 5 |
| Ohio Medical University | " | 54 | " | 8 |
| University of Pennsylvania | " | 278 | " | 70 |
| Pennsylvania College of Dental Surgery | " | 309 | " | 83 |
| Philadelphia Dental College | " | 367 | " | 115 |
| University of Tennessee | " | 58 | " | 15 |
| Vanderbilt University | " | | " | 38 |
| Royal College of Dental Surgeons, Ontario | " | 135 | " | 41 |
| Dental College of Province of Quebec | " | 25 | " | 11 |
| Meharry Dental Department | " | 10 | " | 2 |
| Total | | 4515 | | 1126 |

We find on our desk "The Oread," of Mt. Carroll Seminary, Ill. Mrs. F. A. Wood-Shimer is the founder and principal of this widely-known and well-equipped institution.

The catalogue of the College of Physicians and Surgeons, of Baltimore, just received, shows the following prosperous condition :—Graduates, 1895, 82 ; 1st year Graded Course, 150 ; 2d year Graded Course, 167 ; 3d year Graded Course, 129 ; Post-Graduates, 13—Total, 459.

## HEALTH COMMANDMENTS.

1. Thou shalt have no other food than at meal time.

2. Thou shalt not make unto thee any pies, or put into the pastry the likeness of anything that is in the heavens above or in the earth below. Thou shalt not fail to chew it or digest it, for dyspepsia shall be visited upon the children to the third generation of them that eat pie, and long life and vigor upon those that live prudently and keep the laws of health.

3. Remember thy bread to bake it well, for he will not be kept sound that eateth his bread as dough.

4. Thou shalt not indulge sorrow or borrow anxiety in vain.

5. Six days shalt thou wash and keep thyself clean, and the seventh day thou shalt take a great bath, thou and thy son, thy daughter, and thy maid servant, and the stranger that is within thy gates. For in six days man sweats and gathers filth and bacteria enough for disease; whereupon the Lord has blessed the bath-tub and hallowed it.

6. Remember thy sitting-room and bed-chamber to keep them well ventilated, that thy days may be long in the land.

7. Thou shalt not eat hot biscuit-wait.

8. Thou shalt not eat meat fried.

9. Thou shalt not eat thy food unchewed, or highly spiced, or just before work or just after it.

10. Thou shalt not keep late hours in thy neighbor's house, nor with thy neighbor's wife, nor man servant, nor his maid servant, nor his cards, nor his glass, nor with anything that is thy neighbor's.

Thus endeth the tenth commandment.—Medical Brief.

And there are others like unto them, viz.:

Thou shalt keep on friendly terms with thy stomach and bowels, for in them abideth more than half the ills of life.

Thou shouldst put nothing in them that would give offense, for they are sensitive members of your ventral family, so to speak, and will not hesitate to call you when you least expect, chiefly in the small hours of the night.

Finally, Thou shouldst measure thy days and nights by these golden precepts, so that in the observance thereof thou mayest keep away from the breakers on the other shore.—From the Medical and Surgical Age.

# ANÆSTHESIA.

## DISCUSSION AT DENTAL CONGRESS AT MIDWINTER EXPOSITION, SAN FRANCISCO.

Dr. Chance: I want to give you some thoughts on chloroform. I indorse very largely what has been said in the paper. I have given chloroform a great deal in my life. I have done it, feeling and realizing that the medical profession would not indorse my action. I was the second man to give nitrous oxide in the State of Washington. Dr. Hicks was the first. I have given nitrous oxide—thousands of gallons. I made it once, and then I bought it already made. I have given ether. I have given 1-2-3. It cost me $18 to pay for a broken head-rest when ether was administered. You never heard of a death by chloroform except at the time of the operation. You have heard of deaths by nitrous oxide, after the administration, when the patient had left the office. You have heard of death by ether subsequent to the administration also. Now, Dr. Bonwill has helped me considerably on this administration of chloroform. I am going to give you my idea of giving chloroform. I want to eliminate from what I have to say the theories advanced as to the action of chloroform on the nerve centers or the heart's action. We will assume that that is all right. Now, I give chloroform to my own children, but I never gave it that I was not afraid, and that is the reason I have had no accident. But it is not an abject fear; it is a different kind of fear; I dare to do, because it is necessary. There are three stages in the administration of chloroform. First, relaxation; second, rigidity, if I may use the term; and lastly complete narcosis. If I have a tooth to extract (we are talking about the administration of chloroform for dental operations, not capital operations) I always talk to my patient. I say to the little girl or little boy, as the case may be, "I am not going to hurt at all." I must have the child's confidence first. Then I avoid shock; it is the shock that kills and not the anæsthetic, in nine cases out of ten. I take a pocket handkerchief, and I say to the little fellow, or the adult, "Suppose it were a summer day and the flies were bothering you, you would put your handkerchief over your face; you could breathe just as well, keep the flies off and go to sleep as though you had no handkerchief and were not being annoyed by the flies."

Now, suppose that you take Dr. Bonwill's idea of rapid breathing. You will produce a species of anæsthesia, because you start the oxygen. Instruct the patient to hold up the right hand. When you see it fall take out the tooth, only one; then give it to them again. That is my idea of giving chloroform. I have thrown out of my office everything except chloroform. And I give it in that way. I tell you, if you understand your patient and go at in that way, you will have no accident.

A Member: I will ask, where there is danger of heart failure in these operations, if a heart tonic cannot be given previous to administering the chloroform, and thereby avoid the danger?

Dr. Sichel: Mr. President, since the last century we don't use any more chloroform in surgical operations, but we use Billroth's method of chloroform, ether and alcohol, and you never know of any serious injury to the patient in surgical or dental operations.

Dr. Bonwill: Gentlemen, this is a very interesting subject to me; not so much in the use of anæsthetics of to-day—chloroform, ether, nitrous oxide and the other preparations; but in an experience of twenty years I have not used an anæsthetic in my office, although I have an instrument holding one hundred gallons of nitrous oxide. I have not used any anæsthetic, nor allowed any anæsthetic to be used in my office, nor do I send my patients to other men. Of course you have all heard of the rapid respiration. I believe the gentleman made mention of it to-night with regard particularly to its application before giving chloroform. After the idea of rapid respiration came to me, it was so simple, so trivial, I could hardly believe for six months that it was possible, although seeing it all that time every day almost, when I extracted teeth. It is something that has been laughed at and ridiculed, and still at the same time is recognized by the very best men of the medical and dental professions. One man I met in Europe, Dr. Brown-Sequard, about two years after my article appeared in the Journal of Medical Science, and also in the Scientific American, and was published throughout the world, I believe; he said to me, "Bonwill, I knew, I understood, as soon as I read your article, without trying it, that it was a fact. It is a living fact. I consider it strange that others have not thought of the same thing, because we have physiological facts bearing directly upon it. At the same time they laugh at it. They laughed at me. They have laughed for twenty years. I never answer a man's laugh."

These things come to me from time to time. Every week I see some manifestation of it. We are frequently told that ether and chloroform and other anæsthetics have been used, and they have been an absolute success. It is not wonderful to be laughed at by dentists. It is not wonderful, when they have a preparation like nitrous oxide at hand that they will say, "We will use that instead of using ordinary air."

It is not wonderful because medical men when that came out suggested analgesic state, instead of anæsthesia. They understood the absolute action of air when it went into the lungs. The effect on general circulation was not recognized. I did not know it myself at the time that the action of oxygen was indirectly in the lungs, and was in the circulation. It is a recognized fact now; absolutely true. I said, while some differed with me, that it was not over-oxygenation. While you are compelled in a lengthy operation to give ether or chloroform, either one, by making the patient breathe rapidly for one minute, there is at least five times the amount of oxygen that passes into the circulation that is normal, more than is necesary, that you have over-stimulated your patient beforehand, and there don't begin to be the result that there would be otherwise. Not only that, gentlemen, but the quantity of the anæsthetic that is given is diminished at least one-half. You do not find, even with this nitrous oxide gas, that it has taken the effect of over-oxygenation. It is not over-oxygenation that produces the anæsthetic effect.

An important thing in regard to chlororform anæsthesia I discovered in experimenting upon myself the first time. That was in performing an operation on my own mouth when my teeth were peculiarly sensitive. I said to myself, I will try chloroform, and see if there is any way I can destroy the sensibility to pain, and at the same time be conscious of what I am doing. I found that it increased the sense of touch, it magnified the sense of touch, at the same time that it diminished the pain. I was conscious of what I was doing. That was an important thing to find out. And it was thus that I tried to follow in the destruction of sensitive dentine. I didn't fare very well, because it made my patients sick. I could tell you how I did do that afterwards, by simple rapid respiration.

Now, this gentleman, though I admire his spirit in saying that chloroform is as safe as an other anæsthetic, puts in a good many qualifications. My opinion is that if I could have introduced rapid breathing as a pain obtunder before nitrous oxide came out, you would all be using it. It is always a perfectly safe thing.

I have had my patients, by this rapid respiration, paralyzed to their elbows, so they could not move their arms. Those who had their hands closed could not open them; if opened they could not close them.

It is strange what dentists will do—I must say in their ignorance and prejudice. I gave this to the world. But do you know there has never been a dental society that has ever asked me to read a paper on that subject. Where is their liberality?

A Member: In California.

Dr. Chance: We might amend that by saying the Pacific Coast.

Dr. Bonwill: Thank you. I had to go before the Franklin Institute, a scientific body, in order to read my paper. Instead of asking me out, they got another party to read the paper—to bring my paper into ridicule. They invited him before the society. I had not the right to open my mouth upon it, because as an inventor and patentee that society had placed me under the ban, so that I could not open my mouth. I thanked them very kindly.

I tried chloroform. The next that came to me was the application of electricity. Away back in 1855 that was. I found that by reversing the current, sending it from the nerve centers to the periphery I produced a profounder effect than I could from the periphery to the nerve centers. In a great many patients it reduced the pain; in extracting a tooth destroyed the sensation of pain. While I was operating upon one of my patients with electricity I hurt him badly. What did he do? (Illustrating, the Doctor here drew a deep breath very quickly). Ah-h-h! I said at once: "Nature's anæsthetic." I went back to my boyhood, when I used to pinch my fingers or get hurt. I put it in my mouth this way (illustrating). The pain seemed to go away. Nature's anæsthetic, I said. You will find that throughout the whole of animal life. I went on from that one thing. In all my operations upon sensitive bone I make use of this diversion. In cutting out sensitive bone with sharp instruments, excavators, burs and things of that kind. I always tell the patient when I am going to hurt them, as they say "Ah-h-h" I follow it. Now, you will see how I got hold of rapid respiration. At first I did not think of rapid respiration. But I said, "That is something more than mere diversion. There is some anæstheic effect here. I must look into it." What action has the oxygen on the blood? It is simply setting free through the circulation carbonic acid gas. Now, when I am running my heart comences to beat faster, there is a greater number of pulsations. I am compelled to breath faster. When my heart is at the beginning, say seventy in a minute, I commence, and from twenty respirations go up to one hundred. It is the oxygen that sets free the carbon dioxide in the blood, and it is going past the heart, going to the lungs, and that part is not only affected directly by the carbon dioxide, but the nerve centers are affected. There is an effect produced. It is not an over-stimulation of oxygen, but it is the effect of the oxygen setting free five times the amount of carbonic acid.

There is everything in the way you do it, and yet it is one of the simpliest things imaginable. If you read my article some time ago on hypnotism, personal magnetism and rapid breathing you would see. Men have said to me, it is personal magnetism. A man who read the article on the subject of anæsthesia said: "I see how you do it; personal magnetism." Nevertheless, it is a fact. I know what it is. When I commence with rapid breathing, I simply say to the patient: "Listen to me; do just as I do. It will not hurt you. I am going to put this instrument on the tooth." I put it upon the tooth and commence the operation. The first thing you know it is extracted. I have the evidence over and over again that I have not hurt them. They sometimes say: "You must have hurt me, because I knew what you were doing." When I say to you that for sixteen or eighteen years I have not used any preparation in my office, but have followed this method, I certainly could not have been fooled all this time.

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The Review of Reviews for July, in an article on "Mexico as the Cradle of Man's Primitive Traditions," publishes some of the results of Dr. Augustus le Plongeon's remarkable researches in Yucatan. M. le Plongeon has spent twelve years in exploring and excavating the ruins of lost cities in that interesting country, and is thoroughly familiar with their antiquities. As a result of these investigations, he has become convinced that Yucatan is the long-sought "cradle of the human race." The Review publishes Dr. le Plongeon's speculations for what they are worth, but his laborious research is certainly commendable, and has brought to light much valuable material; it is to acquaint American readers with the wonderful remains of prehistoric civilizations that lie across our Southern boundary that attention is directed to his discoveries.

# THE DENTAL AND SURGICAL MICROCOSM.

A QUARTERLY MAGAZINE.

EDITORS:
SAMUEL J. HAYES, D. D. S., M. S. A. M. FRANCES R. HAYES, A. M.

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## WHO DISCOVERED ANÆSTHESIA BY RAPID BREATHING?

While the Dental and Surgical Microcosm does not propose to be responsible for all that appears in its columns, yet as an instructor and a guardian of the interests of the dental and medical professions, it aims to expose error wherever found, and especially to put before the earnest student in the art and science of anæsthesia, all that may lead him into possession of the facts pertaining to the same.

In another column a part of the discussion on anæsthesia at the Dental Congress, Mid-Winter Exposition, we publish for the double purpose of the value of the principles taught, and to afford an opportunity to call attention for the first time through the press to the assumed discovery of anæsthesia by rapid breathing.

Hitherto our modesty has prevented us from calling attention to the fact that Dr. Wm. G. A. Bonwell received his first impetus and lesson in anæsthesia, or, as he shortly after, in an article in the Dental Cosmos, called it, analgesia, and in which he carefully avoided giving credit for his knowledge of the same to the proper source.

Now, therefore be it known that I, Samuel J. Hayes, then of Mt. Pleasant, Pa., now of Pittsburgh, Pa., did call Dr. Bonwell's attention to this mode and agency of producing anæsthesia by literally blowing as though endeavoring to kindle a wood fire, by which the patient is compelled to inhale a super quantity of free oxygen, which produces a toxicological effect upon his brain and in the nerve centers. When the Doctor's attention was called to this, he ridiculed the idea in rather an insinuating manner ; whereupon, feeling the sting of his remark, I insisted on giving the proof then and there, and in the presence of two other dentists, one of whom is still living, and, I believe will verify these facts, I insisted on the Doctor blowing forcibly and in rythmic movement with my hand, all of which he reluctantly did, until he realized a state of intoxication, and while staggering in his movements, he remarked : "I believe there is something in it."

I may here add that I made this discovery when but a child about ten years of age, though at that time, I knew not what condition it was nor yet what caused the condition save the blowing. I was raised on a large farm near Johnstown, Pa., where we burned wood for fuel. We had the old fashioned chimneys and fire places, in which we did our cooking. I was directed by my mother to take coals of fire with the shovel from the sitting-room to the kitchen, and kindle a fire there. Having put the coals in the fire place, as I had nothing but green chips and green wood on hand, as it was raining and sleeting that day, (and therefore nothing was dry,) I put the wet green chips on the fire and tried to make them burn by blowing. Finding the fire not quick to catch, I eventually became impatient and began blowing very forcibly and rapidly. Suddenly I became conscious of a strange sensation all over me and especially did I realize a numbness all through my body, with a dazed, intoxicated condition. For the moment I thought I had bursted a blood vessel, or something terrible had occurred. Shortly the sensation passed off, when I examined myself to learn whether anything was wrong. Finding I felt all right again, I began to wonder whether it was the blowing which caused that wonderful sensation. I then tried the blowing in a similar manner, and again found the same result produced. I then knew I had made a discovery, but what the nature of my discovery was, I did not know. I now wondered what the effect would be should I blow as hard and fast as I could. Boy like, I at it again, and presently the house began to whirl round and I fell over in a semi-unconscious condition. That soon passed off, and then I hunted up an older brother, related my experience to him, and got him to try it. But as I could not get him to blow hard enough and rapidly enough, he only felt a slight effect. I told my experience to my father, who paid little attention to it. As I grew up it passed out of my mind, and was only recalled again when taking narcotized air. Thus when reminded of my early experience, I again tried the blowing and found I could produce such numbness that, in some patients, two or three teeth could be removed without pain. Thus I experimented till I was thoroughly satisfied of its effects. I began utilizing it in administering such suitable narcotics as chloroform, ether, etc., and for years I have not only utilized this mode of super-oxygenation in the generating and administering of anæsthetics by what is known as the "Hayes Process of, and Apparatus for Generating and Applying Anæsthetics," as the Licensees of this process will testify.

Shortly after I communicated the intelligence to Dr. Bonwell, he came out in an article in the Dental Cosmos stating that he had discovered that an analgesic condition can be produced by rapid breathing. Of course, when we blow forcibly and rapidly we must necessarily inhale, and thus super-oxygenate. It is evident to any intelligent person that when the air is charged with chloroform, ether, chlorolene, etc., that a portion of the free oxygen in the air is necessarily crowded out, and hence as the air contains $N_4O$. simply in a state of mixture and not in chemical combination as in nitrous oxide ($N_2O$) and as all the oxygen of the pure atmospheric air is necessary to maintain life in normal condition, it behooves us to supply the deficit of oxygen in the narcotized air by forcible and rapid breathing, or blowing. When this is had there is no discoloration, no purpleness, and no asphyxia, nor death by the road of asphyxia. This can always be had until the third stage of anæsthesia is reached, when pure oxygen should be let into the air, as by the latest improvement of the Hayes process, when a patient without the slightest tendency to asphyxia can be held in a profound state of narcosis for an indefinite length of time.

Again, we find Dr. Bonwell grieviously in error in his statement that the action of oxygen on the "blood is simply setting free, through the circulation, carbonic acid gas." While it is true that a very small quantity of carbonic acid gas is evolved in the process of combustion in the blood by which, from the presence of the acid by the cerebral glands of the brain and the pneumogastric glands of the lungs, animo-electricity is generated by which the force of life is made manifest. Yet that small quantity of carbonic acid gas is not sufficient to produce asphyxia, nor do any harm in any other way. Nor can it produce the condition attributed to its action in its passage from the heart to the lungs that the Doctor claims is being produced. Will the Doctor kindly tell us how it is possible, by its chemical and pathological effects, to produce the condition or result that he claims is produced? Who does not know that to deprive of sensation the circulation of animo electricity must be arrested in the sensory nerves leading from the organs affected to the nerve center or brain? That the over-production of electricity by the super-oxygeneration of the blood causes an engorgement in the nerve filaments and these nerves consequently become non-conductors, as in the carbons in the electric lamps, and thus the sensation of pain or injury from an affected organ cannot be communicated to the brain, and consequently to the mind or immortal ego. But this interruption in the circulation of the animo-electricity may be prevented by narcotizing the nerve filaments and muscular tissues, thereby contracting them and thus preventing the communication of sensation. Or, it may be prevented by what is commonly called a shock (concussion and revulsion) which may be produced by a sudden action of the mind, or by a club, or by a sudden induction of an over volume of electricity, whereby absensation can be produced. But any amount of carbonic acid gas or carbonic oxide that could possibly be developed by over oxygenation of the blood, could not, by any known natural law, produce the effect ascribed to it by Dr. Bonwell. If Dr. B. still thinks he can give the proof our columns are open for his use. Since much of value can be learned from the Doctor's teaching on anæsthesia, we respectfully call attention to his part of the discussion, as well as that of Dr. Chance. But I deem it a duty that I owe to the scientific world as well as to myself, that the above be made known relative to the discovery of this mode of producing anæsthesia. In this, I do not claim the discovery of anæsthesia, as that was discovered and used by the ancients thousands of years ago. But I do claim the discovery of the mode and agent used in producing anæsthesia as above stated and in the manner above recited. In conclusion herewith, allow us to state that this very principle incorporated with hypnotic suggestion, and used with what is known as the Hayes Process of and Apparatus for Generating and Applying Anæsthetics is the greatest advance in the Art and Science of anæsthesia the world has ever witnessed.

We are happy to note the improved condition of the health of our esteemed co-laborer in the art and science of anæsthesia, Dr. Chas. Gilbert Davis, of Chicago, since his return from his European trip. Years of incessant, earnest toil in his extensive practice, and as surgeon-in-chief of two hospitals, as a lecturer and writer, as well as his duties in connection with the School of Anæsthesia, so preyed upon his physical man that he was forced to cut himself loose from his arduous work and go abroad for rest and recuperation. In this he has been abundantly successful, and while abroad for a year he has not lost his opportunities while with the eminent learned of his profession and of the scientific world to pick up the fresh pebbles coming to the surface at the hands of the scientific of Europe. With increased vigor and force the Doctor has entered upon professional duties and will add greatly to his usefulness by his knowledge, experience and strength gained while abroad. May he live long to enjoy the pleasure of his earnest toil in the promotion of science and the advancement of his profession.

We are pleased to note from the Catalogue of the Dental Department of the University of Minnesota its high standard of qualification fixed for that school, the practical test in thorough examinations and the opportunities and aids employed in three long terms of eight months each. The requirement of a good basic education to begin with and evidence of natural qualification being insisted upon, we look for good work and useful and well trained men and women from this school. The school seems to desire thorough work, well qualified and efficient graduates, rather than large numbers in the classes.

We respectfully call the readers' attention to the article on Prevention of Nausea from the use of Anæsthetics by Prof. E. B. Pratt, M. D., LL. D., every word of which is replete with meaning and worthy the most profound study of the anæsthetist. The Doctor has evidently been a close student in the art as well as the science of anæsthesia, and the reader will do well to note the meaning closely of every sentence.

## CHAPIN A. HARRIS MEMORIAL.

We note with pleasure the very commendable enterprise of erecting a suitable memorial to the honored worthy educator, writer of dental literature and founder of the first Dental College in the world. This worthy object ought to present itself to the favor of the American Dental Association and all other Dental Associations and receive their financial aid. Professional pride should stimulate every dentist to aid in perpetuating the memory of the beloved founder of the dental art and science. To him, more than to anyone else, can the term "founder" be applied in reference to this art and science. It is more than the simple act of having a tooth pulled while asphyxiated with nitrous oxide gas that is to be commemorated. A whole life of devoted services of one of the foremost and brightest minds, ablest writers and earnest educators that has adorned the profession. We publish in another column the worthy appeal of Dr. Gorgas to the profession for aid. The placing of tablets in the two Baltimore Dental Schools is certainly but a just recognition.

## NITROUS OXIDE GAS.

Many are the efforts put forth by the Syndicate of Dental dealers to bring nitrous oxide to the front as an anæsthetic, recognizing the fact that under the present status of the mind of the profession in reference to the asphyxiating effect of this gas. Its use was being abandoned by thousands of dentists who once used it under the impression that it was an anæsthetic. But no greater blatant duplicity and chicanery was ever manifest than in an article on Nitrous Oxide Gas in the "Items of Interest" of July and surely it is an "Item of Interest" as well as of curiosity.

In the first paragraph of this article we are informed that "This gas is obtained by heating a substance technically called Ammonia-nitrate in a retort. It is composed of hydrogen, nitrogen, and oxygen. The last two gases are the chief constituents of the air we breathe and in differing proportions compose nitrous oxide gas." Who does not know that nitrous oxide is composed of two-thirds nitrogen and one-third oxygen by weight or equal parts by volume ?

Then note the equally intelligent argument in its favor that the same chemical elements are the chief constituents of the air we breathe. Such nitrogen and oxygen compose Nitric Acid which we could not tolerate for one moment. Does the writer not know that in consequence of the chemical combination of N 26 nitrous oxide gas will neither support combustion nor sustain life, neither animal or vegetable life. Has he lost sight of the fundamental law of chemistry that when any two or more chemical elements are chemically combined that they lose properties and effects of either and all such chemical elements? Is it not exceedingly stupid in presuming upon the ignorance of the dental profession in making such utterly well known false statements.

And yet this statement is no more ridiculous and false than that other equally intelligent promulgation that Dr. Norman Wells discovered Anæsthesia. In advocacy of this gas the writer also states that "in many cases it has proven to be a remedial agent." "A remedial agent" for what? A remedy? well yes, a substitute for electrocution or the hang-man's rope.

## WORDS OF GOOD CHEER FOR THE DENTAL AND SURGICAL MICROCOSM.

"We are glad of an opportunity to see your journal and wish you the best of success.

Very respectfully,
Journal of Orificial Surgery, Chicago."
Jan. 21, 1895.

Montreal, Canada.

"Welcome back to you. Congratulate you on your independent and honest attitude on the discovery of anæsthesia.

W. Geo. Beers,
Dominion Dental Journal."

"With pleasure we place your useful journal on our exchange list, wishing you success.

Fraternally yours,
The Medical World,
Jan. 21, 1895. "Per J. J. F."

"Very glad indeed to welcome the Microcosm and hope it may live long and prosper.

Very truly,
Jas. H. Harris,
University of Maryland."

"We received the copy of the Microcosm, which you kindly sent us, and read with interest a number of articles in it. You are certainly on the right line. We hope that you will place us on your exchange list. We have placed you on ours.

Respectfully yours,
L. D. Rogers, Ed.,
The People's Health Journal, Chicago."

THE
DENTAL AND SURGICAL
MICROCOSM.

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# WHO DISCOVERED ANÆSTHESIA?

BY SAMUEL J. HAYES, D. D. S.; M. S. A., PITTSBURG, PA.

It would seem quite necessary in order to ascertain who was the discoverer to first determine definitely what was discovered, and what the distinguishing characteristics are of that which it is claimed, was discovered.

If anæsthesia was discovered; what is anæsthesia? How may it be definitely known. That it is a physical condition of an animal or man in which there is an absence of sensation is generally understood even by the most illiterate. But that it is a definite physical condition differing radically from other conditions in which there may be absence of sensation, is not so well understood; and more especially what these essential, distinguishing features or attributes are, we regret to say, is not clearly understood even by many of the medical and dental professions.

Therefore, it may not be amiss to note precisely what condition is meant and in what respect it differs from other physical conditions to which it bears a marked resemblance in some respects, but from which it radically differs in the essential distinguishing characteristics.

The word anæsthesia is of Greek origin, and is derived from the word Æsthesia by the aid of the negative prefix an, which means the opposite, or against.

Æsthesia refers to sensation or prehension of feeling. But in order to feel or have sensation, we must have in continuance the force and functions of life without which we could have no sensation. Therefore, if anæsthesia be the opposite of æsthesia as pertaining to sensation, there must be in this physical condition also the continuance of the force and functions of life in the absence of sensation and pain. Hence, anæsthesia must be defined (if correctly defined) as "a physical condition in which the force and function of life, are in continuance under modification—ordinarily by medico chemical agents whereby absensation is produced by narcotizing the muscular tissues and nerve filiaments whereby the neural current is interrupted, preventing the conveyance ot sen sation." In this respect, it differs radically from asphyxia in which condition there is also, absensation, since asphyxia is a condition in which the force and functions of life, are suspended or abrogated. It also differs in this respect from syncope or paralysis of the great nerve centers as in these there is a suspension of the functions of life. Therefore, any condition in which there is absensation, and at the same time the force and functions of life are in continuance, is anæsthesia; or, if there be even a diminution of sensation with the force and functions of life continued there is a degree of anæsthesia. Hence, we must recognize the fact that there may be degrees or stages of anæsthesia as well as of asphyxia or of paralysis. This leads us to a recognition of the fact that drunkenness in its various stages is really anæsthesia, and that modern hypnotism is simply hypnotic anæsthesia when conducted so as to interrupt the neural current in the sensory neves to the extent that absensation is produced. Therefore, it must be understood clearly and definitely that this physical condition that is claimed to have been discovered, and that is such a gracious boon to suffering humanity is "a condition in which the force and functions of life are in continuance under modification—ordinarily by medico chemical agents narcotizing and contracting the muscular tissues and nerve filliments whereby absensation is produced." Also, that anæsthesia can be produced by injecting the anæsthetic into the stomach, or into the rectum, as well as into the lungs.

That this definite physical condition has been discovered, and also the how, or means by which it can be produced, will not be questioned. But who made the discovery, seems to be a mooted question. Yet in the face of history, it may not bc so difficult to determine who did not discover anæsthesia as it may be to ascertain who first discovered this condition, and also how produced.

It is the first discovery of anæsthesia that is claimed for Dr.

W. T. G. Morton. also for Dr. C. T. Jackson, by others for Dr. J. Y. Simpson and by others for Dr. C. W. Long, and still by other more anxious erratics for Dr. Horace Wells. It is true, that when anything becomes known to any person he first discovers it at that time. In this sense all who know this physical condition might claim to be the discoverer of anæsthesia. But the question is, who first discovered anæsthesia? and how it could be produced?

With this clear understanding of the nature of the question as well as to the precise, definite physical condition of anæsthesia, we shall now proceed to condemn the claims set up for the discovery and establish beyond the peradventure of a doubt by first quoting from a paper of one of the most sanguine and zealous claimants for Dr. Horace Wells as the discoverer:

"Thine own mouth condemneth thee and not I,
Yea, thine own lips testifieth against thee."

We quote from the noted paper of Dr. James McManus, of Hartford, Conn., delivered at the union meeting of the Connecticut Valley Dental Society and the Connecticut State Dental Association at Hartford, May 16-19, 1893. "In looking up the records of the centuries, we find mention made of various medicines that have been used for the purpose of rendering patients insensible to pain, while undergoing surgical operations.

Homer mentions the anæsthetic effects of nepenthe.

Dioscorides and Pliny allude to the use of mandragora.

Linus Apuleius, who lived 125 A.D., and whose works were republished in the fourteenth century, says, that if a man has to have a limb mutilated, sawn or burnt, he may take half an ounce of mandragora wine; and whilst he sleeps the member may be cut off without pain or sense.

A Chinese physician, who lived in the third century, named Hoatho, gave his patients a preparation of hemp, whereby they were rendered insensible during surgical operations.

The soporific effects of mandrake are mentioned by Shakespeare as well as other draughts, the composition of which is not given.

After the lapse of centuries, Dr. B. W. Richardson, of London, procured specimens of mandragora root, and had wine made from them, which he found by testing to have the properties ascribed to it by the ancient writers. Theodoric, in a surgical treatise as early as the thirteenth century, gives directions how to prepare a "Spongia Somnifera" for inhalation before operations.

Dr. Simpson makes the statement that ether was known in the thirteenth century, that its formation was described in the sixteenth century by Valerius Cordus and was first named "ether" by Frobenius, 1730.

A German work, published in 1782 by Meisner, mentions the case of Augustus, King of Poland, who underwent an amputation while insensible by the use of a narcotic.

Heroditus refers to the practice of the Scythians of inhaling the vapor of a certain kind of hemp to produce intoxication, and on September 3, 1828, M. Girardin read to the Academy of Medicine of Paris a letter describing surgical anæsthesia by means of inhaling gases.

The ancients did know of and used the narcotics named; and possibly with all success that is claimed by these writers. * * *

It is on record that the ancient Greeks, Romans, and Arabians were familiar with and employed many substances that they found acted more promptly when inhaled than when taken into the stomach, and after the discovery of oxygen by Priestley and Scheele in the middle of the last century, experiments were made with gasses by physicians for the cure of diseases, especially of a consumptive type.

A medical institute was established in Bristol, England, in 1798, and Sir Humphry Davy was appointed superintendent. While there he made a study of the effects of nitrous oxide or laughing gas, and after making many experiments with it, he made this remarkable statement early in 1800 (1799 Ed.), "As nitrous oxide gas appears capable of destroying physical pain, it may probably be used to advantage during surgical operations in which no great effusion of blood takes place." He also stated that he had inhaled the gas and secured relief from pain while cutting a wisdom tooth. (The gum from over an erupting wisdom tooth. Ed.)

Note first in the above quotation that Dr. McManus voluntarily states without any misgivings in most emphatic manner that history records the facts as to the frequent use of anæsthetics, and on numerous occasions as well as for specific surgical operations the production of anæsthesia by the use of drugs, specified both by inhalation through the lungs and by introduction through the stomach, not only by the ancients, but through all the centuries of the Christian era.

Then note secondly that the Doctor distinctly states that Sir Humphrey Davy inhaled nitrous oxide and secured relief from pain while submitting to a surgical operation, and that he then and there suggested that this gas might be used for surgical operations where there would be no great effusion of blood. That this surgical operation was submitted to and this suggestion made before Dr. Wells was born.

Note third, that while Sir Humphrey Davy made this discovery and suggested that nitrous oxide might be used to produce a condition of absensation in which surgery might be performed, he did not state that it produced anæsthesia, nor has anyone ever established that it is capable of producing anæsthesia. But on the contrary, it has been proven again and again, that it neither supports combustion nor sustains life, neither vegetable nor animal life; that in consequence of $N_2O$ being a chemical combination it has no free oxygen, and consequently cannot sustain life, but must certainly produce asphyxia, and if administered to the exclusion of atmospheric air, or free oxygen, death in less than three minutes.

Note fourth, that it is admitted by Dr. McManus that Dr. Wells did not discover nitrous oxide, and that he did not have the first surgical operation performed on himself, and that he was not the first to suggest that such operation might be performed during the asphyxia produced by the gas. Therefore, it would be the most absurd and ridiculous undertaking possible to urge a claim for the discovery of anæsthesia by Dr. Horace Wells, who had simply submitted to the extraction of a tooth while asphyxiated by nitrous oxide gas, and demonstrated that it might be used thus for the extraction of teeth, while at the same time it was known that surgical operations could be performed without pain or sensation while rendered unconscious with this gas.

In further proof of the fallacy thus promulgated, we cite the words of Dr .Thos. Fillebrown in giving his historical sketch of the discovery of anæsthesia. He says in his oration (on the remarkable occasion of the Wells' celebration), "The ancient nations hunted for anæsthesia. Homer mentions the inhalation of hemp for that purpose. Pliny and Apuleius refer to the mandragora wine. The Chinese used hemp in the third century. Theodoric described the "Spungia Somniferum" in the thirteenth century. Ether was also known at that time. In 1800 Sir Humhprey Davy said nitrous oxide might probably be used to advantage in surgical operations when there was no great effusion of blood.

We further cite to the verification of this history of anæsthesia, as well as to the history and use of nitrous oxide the words of the late Dr. James E. Garretson and others who have spoken and written, showing most conclusively that anæsthesia was first discovered by the ancients, and that various drugs—narcotics—have been used for the purpose of producing the physical condition (more properly named and known as anæsthesia) throughout all the centuries of the Christian era.

Therefore, it is most absurd and even ridiculous to claim that any one has made this first discovery of anæsthesia in the nineteenth century.

True, both Drs. W. T. G. Morton and C. T. Jackson should have credit for the discovery that sulphuric ether could produce anæsthesia, in which condition surgical operations could be performed without pain, and should have also meritorious honor for the introduction of anæsthesia by use of sulphuric ether. This much and nothing more can be truthfully claimed for either of these gentlemen. They most emphatically did not discover anæsthesia, but simply discovered that this condition could be produced with sulphuric ether, and was the means of introducing the use of this drug for that specific purpose. The same may be truthfully said of Drs. Jas. Y. Simpson and C. W. Long for the discovery that aerated chloroform could produce anæsthesia, and for their commendable effort to introduce the use of the same. To them also belongs the honor and credit for their noble deed. Yet, they did not discover the condition of anæsthesia, as any one who is familiar with history as recited above must know.

But now, what shall be said of the preposterous claim of the friends of nitrous oxide gas for the discovery of anæsthesia by Dr. Horace Wells?, Then what can be truthfully said of the men and their motives in making this most absurd claim in the face of the facts as even presented by themselves in their own utterances, even in the very act of the celebration of this proclaimed discovery.

They have all admitted that Priestley discovered nitrous oxide gas and that Sir Humphrey Davy had the first surgical operation performed on himself without pain while in a condition of absensation produced by use of this gas, and that he then suggested its use in surgery, and that all this took place even before Dr. Wells was born. Not only so, but nearly every man concerned in this wonderful celebration has admitted that this nitrous oxide can only produce asphyxia.

Then from their premises, they derive this "*reductio ad absurdum*" for their fallacious conclusion that Dr., Horace Wells did neither discover nitrious oxide,nor that it produced a condition of insensibility, nor that a surgical operation could be performed while in a state of insensibility produced by the inhalation of this gas, whether that state be asphyxia or anæsthesia. Yet, he did discover anæsthesia because we the avowed friends of nitrous oxide gas, after announcing that anæsthesia was discovered by the ancients, and that various drugs have been used throughout all the centuries of the Christian era for the purpose of producing anæsthesia, and that divers surgical operations were performed without pain by use of these drugs, yet, Dr. Wells did discover anæsthesia because we must say so, notwithstanding we have said that many others produced anæsthesia long before Dr. Wells was born. This condemnation comes out of their own mouths, and when put to them burns like the sting of an asp.

Hence, the avowed friends of nitrous oxide gas for the pretended purpose of producing anæsthesia, were unwilling to meet the writer in open discussion of the art and science of anæsthesia at the joint meeting of the Connecticut Valley and the New England Dental Associations. It is conceded that in every act and deed of intelligent and rational beings there must be a motive. Is it difficult to surmise the motive that has brought these principal actors in this effort to popularize nitrous oxide gas into their present dilemma? The members of the syndicate of Dental Dealers control the Dental Journals, they also indirectly control the most of the Dental Associations through their friends in these associations whom they exalt in these journals, and whom they protect by these journals. This much we feel necessitated to say by way of an apology for the odious dilemma into which the avowed friends of nitrous oxide gas are found.

# THE THERAPEUTIC VALUE OF ADDRESS.

BY L. C. FRANZ, M.D., MALDEN, MASS.

When a person undertakes to bring to the notice of others matters previously interesting only himself, his mode of attack is commonly spoken of as "his address." He has a good address if it is a persuasive one; if otherwise, a poor address. Manner has something to do with it, but manner misdirected through ignorance of human nature or lack of faith and purpose would not be address.

A good address implies art. There are comparatively few who cannot acquire it, and there are none who can have it without study and self-training. It is not to be taught. It can be developed only along the lines of our own individuality, and when acquired, amounts simply to the power of obtruding that individuality upon others, in such a manner as to dominate, for the time being, their minds and wills.

Address is essential to business success, and professional and social influence largely depend on it. In this view there would be sufficient reason for its cultivation by the medical practitioner: he fills a place which Nature herself has provided in the social economy, and his rewards are very unlikely to exceed the measure of his service. Yet upon his reputation even these will depend, for that part of society which can pay, will surely ask about it before employing him. But the purpose of this paper is to show that a good address is not important merely to the securing of the rewards, or of the opportunities of a large practice, but to the welfare of his patients.

People call a doctor because they are in trouble, and want help. Help is not expected of the weak, but of the strong. Let the physician manifest the least indicision or dependence upon the judgment of the patient, or the patient's friends, and he is not, from that moment, what they want. Nor, on the other hand, will it answer to offend them or to arouse their opposition. From previous experience of the malady, they may be able to make valuable suggestions, or, from ignorance or prejudice, they may have strong objections to certain drugs or methods of treatment. But if the doctor is to be of use, it is of the greatest importance that he should be the sole authority, and that he should command their full confidence. To effect these results he must have an address that will dominate the situation.

And not merely to assure a consistent and scientific treatment of the patient, but because there is no longer any doubt that mental and sub-mental states have a powerful reaction upon physical conditions, especially when the latter are unbalanced and out of harmony. Mind-cure, Faith-cure, Psychic sympathy, Hypnotic control and suggestion, these are terms which to-day have a scientific significance, and there can be no doubt that the emotions and convictions of the mind are able to localize vibrations both to good and evil purposes throughout the entire vital organism. It has long been admitted that there are physicians whose presence in the sick-room brings hope, rest, and alleviation of pain. Nor is it an uncommon experience with the average practitioner, that the state of the patient sensibly improves during his visit. Even in cases where he has given medicine to produce a certain result, he will often find that it succeeds in his presence and fails in his absence. These things could not happen without a reason. And that reason can only be sought in the influence of a mental state imparted by the physician to the patient.

Positiveness is the first essential to a good medical address. By that I do not mean dogmatism in statement or direction, though that may be required; but the determination of the subjects of thought and conviction is his, while he remains in the sick-room. The more the patient's mind can be taken possession of, the more power he will have to benefit the patient. Manifestly the patient, before his arrival, has filled the room with himself and his sufferings. These are to be exorcised; for when that happens, the symptoms invariably improve. Let the doctor come in and take his cue from the patient, especially if it be a story of symptoms, and he is at once put in the negative relation with just what he ought to dominate. The instinct of all good physicians is to cut a patient short in the tale of his woes, and to suggest something else to talk about. It is admitted that the subject of his thoughts has a strong influence on his state. But it is little realized how consequential it is that the doctor attract the patient's mind, first to himself, and then, by a "suggestion" to a channel that makes directly for health. Few sick persons can be trusted to originate positive and healthy thinking; and few of the friends or nurses to be met with in sick-rooms are any better able to direct the patient's thought than to prescribe his medicines. And should the patient be in no state to converse, these may be the media through whom alone the healthy impulse can be given. Now, there is nothing that renders a man more positive to his neighbors than enthusiasm, or a state of mental energy. Those who are at rest, or going slow, invariably get out of the way of the energetic. Motion and power are the impressions to be made. But remember that fuss is a kind of motion that is rarely required, and that is least likely to overawe and dominate. In a word, Dignity, Energy, and Determination of mind to a definite end are the three factors of a positive address.

Positiveness usually succeeds, even when it goes alone. It is not uncommon to hear persons say that Doctor-So-and-So is a splendid physician, but rough and dogmatic. But the philosophy of the success does not lie in the roughness, but in the domination of the case in hand. Equal success may go with urbanity, if it conceals the lion's paw. A tactful and gentle manner is only a disadvantage when it weakens the impression of personality. Under other conditions, it is in itself a power. The more easily and smoothly dominance can be attained, the more complete and lasting will be its power. It is the unconscious will—the sum, so to speak, of the patient's molecular vitalities, that chiefly controls his physical states, and this must not be antagonized by the exhibition of an offensive rudeness. Rather should it be won to confidence, and physical sympathy, by the sensual modes of voice, glance, and touch, which it can apprehend. This is simple, when you reflect that all you have to do is to refine a little on the precise method you would employ to win the affections of a dog or a horse. It is the animal nature you are to benefit by your visits, and it is that you should seek to dominate. The more directly you can appeal to it, the greater will be your success. Faith, for therapeutic purposes, may be regarded as the assent of the animal, or unconscious will; and this assent may be of the greatest value to a healthy issue. The doctor who can at once attract and dominate his patient, will, as a rule, be able to evoke it.

A good address is not the least important part, therefore, of a physician's equipment. Fortunately there are a few who have the necessary intelligence and application to meet the requirements of our medical schools, to whom its acquisition, or more properly, its development, would be difficult. That is commonly left to a sort of natural growth, as the responsibilities of medical practice, becoming familiar, give confidence and decision to the practitioner, instead of being conceived and cultivated at the outset, is due, no doubt, to a misconception of its therapeutic value, and of the proper constitution of professional modesty.

[What Dr. Franz so ably says of the medical practitioner is equaly true of the dentist. In few places is the artist more readily distinguishable from the artisan than in the methods employed at the dental chair. The sympathetic voice, glance, and touch of the operator effect as desired a result as his dignified manner and quiet determination. Hypnotic suggestion, psychic control, etc., are terms often more expressive of a humane, common-sense way of using both inherent and acquired skill than of any subtile and mysterious efflorescence of nervous force.

But thanks to the researches of science and to developments in the line of alleviating pain, the dread of dental surgery, and of surgery in general, is reduced to a minimum. Among the numerous means employed for this purpose, when one is found attended by absolutely no results injurious to the functions of the system, "It is a consummation devoutly to be wished." Such is the well-known and widely-used "Hayes Process of and Apparatus for Generating and Applying Anæsthetics," valuable alike to the dentist and to the physician. By this Process, however extensive and severe is the surgical operation needed, the patient, anæsthetized by this method, in his quiet, restful condition, is "Like one who wraps the drapery of his couch about him and lies down to pleasant dreams." M. F. R. H.]

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Rules for the Setting of Oxy-Phosphate Cement Filling Material.—If the cement sets too quickly add a few drops of a saturated solution of borax and water to the bottle of liquid to make it set slower.

If the cement sets too slowly add a few drops of pure hydrochloric acid to the bottle of liquid to make it set quicker.

If your bottle of liquid be full four drops of either will suffice. If your bottle of liquid be two-thirds full three drops may be added, and if only half full two drops will be sufficient. Whatever be the quantity of liquid in your bottle, the borax solution or the hydrochloric acid may be added in these proportions.

# ANÆSTHESIA VS. ASPHYXIA.

BY S. A. AYKROYD, D.D.S., L.D.S., KINGSTON, ONT.

(Read before the Eastern Ontario Dental Association.)

Having seen the question, "What is the difference between Anæsthesia and Asphyxia?" in the Dominion Dental Journal, I became interested and took to discussing it with my co-laborer, the editor of the "Question Drawer," who suggested that I prepare a paper for this meeting on the subject.

If you are sorely afflicted by what I say, blame not me, but the instigator of the deed. Jokes aside, gentlemen, I have been reading some, and have gleaned a little from off the field of knowledge, i. e. the question, and with the hope that I may be able to present you with some food for thought, or, at least, afford a basis for discussion. I undertake this task. He who deals with life should know the laws that govern it. But what are laws and what is life? may be asked.

Laws are relations between cause and effect. The same cause will always produce the same effect, if that on which you operate is the same. If this were not so, science would be impossible. Laws are eternal and fixed principles, to be in harmony with which is life, the opposite is death. It remains for man, then, to discover the laws of life and obey them.

Life is a phenomenon which as yet has not been satisfactorily defined. I asked the professor of biology in Queen's University, What is life? After several days he replied, "I can't answer your question." Life has been expressed by Savory as "A state of dynamical equilibrium." Life, however, does not stand alone; it is but a special manifestation of transformed force. Anæsthesia has been variously defined. A definite understanding of what is meant by it is a matter of no small importance to those whose mission it is to relieve pain and save life.

Webster says, "An anæsthetic is that which produces insensibility." Our own Dr. Teskey says, "Anæsthesia is deprivation of the sense of feeling from any cause." Surely such definitions cannot be scientific, for if they are, then a club, a rope or a cannon ball would be an anæsthetic, and death itself, anæsthesia. Dr. Thomas, of Philadelphia, says, "Anæsthesia is an unconscious condition produced by the inhalation of various drugs, the forces of life being maintained in the meantime." This is a more comprehensive definition, but still we are not satisfied. Dr. Hayes, in the Dental and Surgical Microcosm, from which I take the liberty to quote freely, says, "Æsthesia is a condition of sensibility, but in order to realize sensation the force and functions of life must be continued."

Anæsthesia is the opposite of æsthesia, and is a condition of insensibility, and consequently in this condition there must also be in continuance the force and functions of life." Therefore the correct definition, acording to Dr. Hayes, is, "Anæsthesia is a physical condition in which the force and functions of life are in continuance under modifications whereby absensation is produced." This, it seems to me, comes nearer to a scientific definition than any other I have seen. The force of life is free oxygen, or rather, according to recent discoveries in science, electricity is the great force of life, and that oxygen is the carrier of this electricity.

Dr. W. B. Richardson, an English physiologist, has conducted experiments showing that pure oxygen becomes devitalized by repeated inhalations, that in breathing the oxygen had undergone some change unknown to the chemist, and that if the oxygen be electrically charged it is revitalized and will again support life.

The chief functions of life we are interested in during anæsthesia are circulation and respiration. To properly understand the science of anæsthesia, we must recognize the double circulation in every animal, the one dependent upon the other. "Arterial and venous circulation is as dependent upon neural circulation in the nervous system as life is dependent upon the functions of life. The brain is the heart of the nervous system, and it might be designated the animal electric storage battery."

"From the basic element, free oxygen, animal electricity is generated by the pneumogastric glands of the lungs and the cerebral glands of the brain, and stored in this storage battery to be sent out through the motor nerves as a force to move the organs of the body. This circulation through the nervous system brings back to the brain the greater portion of the electricity, through the sensory nerves, and thus information and impressions are received from the material world by the mind or spirit of man."

"Interrupt or arrest this circulation in the nervous system, and you suspend sensation and the force and functions of life, and then you have the first stage of death. From what has been said it is obvious that a true anæsthetic must contain sufficient free-oxygen to fill this storage battery with animo-electricity, or nerve-vital fluid, that the functions of life may not be interfered with. In administering an anæsthetic, death can only be caused by either asphyxia or by shock. Shock is produced by the mind or by the intended anæsthetic agent, or by both acting simultaneously."

What is asphyxia, and how is it produced? Blood which contains a normal proportion of oxygen excites the respiratory centre, and consequently the respiratory muscular movements are normal. A deficiency of oxygen gives a condition of muscular movements called dyspnœa (difficult breathing). When respiration is stopped by interference with the passage of air to the lungs by supplying air devoid of oxygen, a condition ensues which passes rapidly from the state of dyspnœa to what is termed asphyxia, or suffocation, which quickly ends in death.

The ways by which asphyxia may be produced are numerous; for example, by prevention of the due entry of oxygen into the blood either by obstruction of the respiratory passages or by the introduction of gas devoid of oxygen, or of a gas containing oxygen which is not free, and, consequently, a due interchange in the blood cannot take place (a gain of oxygen and a loss of carbonic acid).

The symptoms of asphyxia are: violent action of the respiratory muscles and more or less of all the muscles of the body, lividity of the skin and all other muscular parts; the veins become distended and the tissues seemed gorged with blood, convulsions and insensibility, which is quickly followed by death. The conditions which accompany these symptoms are: (1) More or less interference with the passage of blood through the pulmonary blood-vessels; (2) Accumulation of the blood in the right side of the heart and in the systemic veins; (3) Circulation of impure blood in all parts of the body.

The cause of these conditions and the manner in which they act so as to be incompatible with life may be briefly considered: (1) By the violent and convulsive action of the expiratory muscles, pressure is directly made on the lungs, and the circulation through them is proportionately interfered with. This is the direct cause of the accumulation of blood in the right side of the heart. (2) The vaso-motor centres, stimulated by blood deficient in oxygen, cause contraction of all the small arteries, with increase of arterial tension, and as an immediate consequence the filling of the systemic veins. The increased arterial tension is followed by inhibition of the action of the heart, which, contracting less frequently and gradually enfeebled also by deficient supply of oxygen, becomes over distended by blood which it cannot expel. At this stage the left as well as the right cavities are distended with blood. The ill effects of these conditions are paralysis of the muscles of the heart by over-stretching, venous congestion and consequent interference with the function of the higher nerve-centres, especially the medulla oblongata. (3) The passage of non-aerated blood through the lungs and its distribution over the body are events incompatible with life for more than a few minutes. The rapidity with which death ensues in asphyxia is due to the effect on non-oxygenated blood on the medulla oblongata, and through the coronary arteries on the muscular substance of the heart.

Experiments have been performed on the lower animals, and it has been found in the case of the dog, during simple asphyxia, that is by simple privation of air by plugging the trachea, that the average duration of the respiratory movements was four minutes five seconds. The average duration of the heart's action was seven minutes eleven seconds, recovery not taking place after the heart ceased. Thus we see that asphyxia is a physical condition radically differing from that of anæsthesia.

"In anæsthesia the force and functions of life are in continuance under modification, whereby absentation is produced by medico-chemical agents, narcotizing the muscular tissues and the nerve filaments, thereby interrupting the neural current in the sensory nerves. In asphyxia the force and functions of life are suspended or abrogated whereby absensation is produced by the deoxidation of the blood, thus producing insensibility by preventing the generation of nervo-vital fluid and its circulation in the sensory nerves. The anæsthetic agent must have sufficient free oxygen to properly support combustion and sustain life. An asphyxiant must be deprived of free oxygen or must not have sufficient to properly support combustion and sustain life. Oxygen chemically combined with any other chemical element will neither support combustion nor sustain life."

"Therefore, nitrous oxide gas ($N_2$ O) will no more sustain life than carbonic acid gas, or nitrogen gas, or olyphiant gas, or any other inert gas. While it is maintained that $N_2$ O will support combustion by applying a lighted taper or piece of heated charcoal, the fact is lost sight of that there is not heat enough in the human body to decompose the two chemical elements and set the oxygen free, and that it is the free oxygen and not the nitrous oxide gas that supports combustion."

Robert Marston, Lancaster, England, writing in the Items of Interest, in substance says: "To suppose that nitrous oxide is an anæsthetic is to assume that it either plays the part of a toxic compound radicle, in the vito-chemical equations of the body, or else that its disassociated elements separately participate in the play of affinities, but, if nitrous oxide disported itself as a toxic compound radicle, its narcotic power would assert itself, as that of chloroform, ether and other narcotics, though atmospheric air were freely admitted with it to the lungs, a result which practitioners know is impossible of attainment. On the other hand, if nitrous oxide became chemically split up during the corpuscular changes, arterialization of the blood would in that case inevitably ensue with abnormal energy, owing to the greater proportion of oxygen which nitrous oxide ($N_2O$) contains, as compared with the proportions of oxygen and nitrogen found in common air ($N_4O$.) That this arterialization does not take place is sufficiently proved by the characteristic lividity of gas patients and other indications."

"Physiological effects are incompatible with the supposition that nitrous oxide is an anæsthetic; appearances distinguish it as a negative, asphyxiant.

"When nitrous oxide comes to be regarded as a negative, asphyxiant it will then be understood why it has the reputation of being the safest of all, so-called, anæsthetics. The prevailing opinion that it is a narcotic, whose peculiar action distinguishes it so distinctly from the dangerous compounds of its class, appears irrational when the diffusibility and cumulative tendency of all respiratory narcotics is relatively considered. During that kind of anæsthesia which results from oxygen starvation, all the co-existing conditions are relatively connected; their deflection is uniform, and represents a string of alternated causes and effects, whose tension to rebound with reparative co-operation so soon as the swerving power of the asphyxiant is removed, constitutes that ignored cause which distinguishes the safeness of nitrous oxide from the ungovernable capriciousness of every tabulated 'anæsthetic.'

"The absence of oxygen causes the accumulation of natural products and carbonic acid, which have a toxic action on the nerves, obtunding their sensibility. When chloroform, ether or other anæsthetics are used, the result is different; toxic asphyxiants have a stronger affinity for the complex molecules of nervous tissues than for the crude and comparatively elementary substance of the circulation. Thus they directly attack the fundamental principles which, subservient to the first cause, create and control all the phenoment of life, sometimes paralyzing the vital endowments, even while the respiratory changes are, to all appearances, ordinarily taking place."

Although deaths are rare from nitrous oxide gas, let us remember, to obtain anything like complete insensibility with it, we must push the patient dangerously near the death-line, and that no anæsthetic agent should be administered without the admission of plenty of free oxygen or atmospheric air.

The time is coming when we shall be able to understand the physics of the breath of life, or of the oxygen of respiration, which is also the oxygen of combustion; how the inrush of oxygen, by way of capillary gates of the lungs and the corpuscles of the blood, to the tissue-cells of all parts of the system, carries a ceaseless volume of vital energy; how this animating and life-maintaining energy is nothing less than electricity of absolute dynamic strength and sureness—every breath, according to its size a definite quantity of vitalizing, heating and sustaining energy, and how the flow and charge of this energy, in all parts of the system, will maintain functions and operate organs which it has, in fact, created.—Dominion Dental Journal.

## A DEATH FROM BROMIDE OF ETHYL.

L' Union Medicale, May 8, 1894, reports that Mendoza reports a case of a death following anæsthesia produced by bromide of ethyl. Ten seconds after the application of the compress to the face the patient's color became cyanotic and the veins turgescent, the eyes were moved convulsively, the pupils were widely dilated. Rythmic tractions of the tongue and artificial respiration were practiced for thirty minutes, and active flagellations resorted to without effect. The cause of death seemed to be respiratory failure.—The Dental Register.

(No, the cause of death, as indicated by the symptoms and evidence given here is evidently shock, and cessation of the functions of the heart by its chemical and pathological effects.—Ed.)

# ANCIENT AND MODERN HYPNOTISM.

BY W. C. ACHARD, GLOUCESTER, N. J.

**(Read at the regular meeting of the Truman Dental Society, April 4, 1895.)**

I will endeavor to give a brief history of hypnotism, a description of the peculiar phenomena accompanying it, and a few words regarding its application in dentistry:

Hypnotism, of which the student of medicine has heard a great deal during the last few years, is by no means the new theory that many consider it; in fact, it is the very oldest method of curing diseases.

There is a sect in Egypt which has practiced it for over 4,000 years. Later on we have the Mumo-Jumbo-men of Africa, the medicine-men of the American Indian, the "charmers" of India, the Roman sibyls and Greek oracles. Of the last named we have, foremost, the oracle of Delphi, where in Apollo's temple a priestess sat for hours on a three-legged stool, which stood over a chasm in the ground, from which rose vapors of sulphur. In due time she entered the somnambulistic state, and prophesied to the awed listeners. Among the Israelites we have the well-known story of the "Witch of Endor." But of all followers of this most wonderful art, the fakirs in India surpass in skill all European hypnotizers. It is there where the greatest cures of diseases are effected, although accompanied with much unnecessary mummery.

In the middle ages there were the witches, which, in most cases, were poor unfortunates who had more than ordinary power of "animal magnetism," (as Mesmer called hypnotism). Then came, in 1662, Greatrakes, an Irishman, and a distinguished soldier, who had a revelation in a dream that he could cure scrofula by the laying on of hands. He accomplished some remarkable cures, and was followed, in 1773 by Gassner, an ex-monk of Suabia who traveled through southern Europe, using Latin phrases in hypnotizing his patients. But it remained for Mesmer to demonstrate the existence of "animal magnetism" in the human body.

Friedrich Anton Mesmer was born in 1734. After studying medicine in Vienna, he began his researches in "animal magnetism," the result of which I will give in his own words. He says: "Through certain manipulations, such as touching, stroking—in a word—magnetizing, even simply by merely a strong act of the will, one can produce this power in persons, impart it to others, and cause the most marvelous and wholesome effects." But he was considered a juggler by medical men, and expelled from Vienna, in 1774, for the alleged cure of a blind girl, (the case of Marie Paradise). He moved to Paris, and opened there his famous parlors. As it may interest you, I will describe his method for the treatment of all diseases: In the operating-room there was, in the middle of the floor, a round tub, with a diameter of five feet, which was provided with a lid. On the bottom of it bottles were placed in such a way that the necks of some pointed to the center, and of others to the periphery. The tub was then filled with water to cover the bottles, and bent iron bars protruded through the lid. The walls were covered with mirrors, which, according to Mesmer's idea, heightened the effect of the hypnosis. The patients were seated around the tub closely, and touching each other's knees, each holding one of the iron bars protruding through the lid, and also each other's hands. They were then connected by a cord, which was tied around their waists to assist in the passing of the "magnetic fluid." A mystic twilight pervaded the room, and the ear was charmed by sweet music of the harp and piano, and also by the soft melodies issuing from a harmonium, which Mesmer played with a master hand. After some time, the men and women sitting around the tub began to have peculiar sensations, as nervous twitchings, etc., and it was then that Mesmer entered solemnly, dressed in a fantastic robe of embroidered silk, holding in his hand an iron rod, with which he majestically walked around, stroking the patients. Some terrible crises then ensued, the patients became hysterical, some having terrible convulsions. The most afflicted were then placed in a room, the floor and walls of which were padded.

It must be admitted that Mesmer really achieved some remarkable cures, which were discussed by the whole scientific world, and which led to the celebrated French Commission, appointed in 1784, by the government, to inquire into the nature of the new phenomena. This learned body of scientists included Franklin and Lavoisier, and the result of the investigation may be seen in the last words of this report: "Magnetism is one more fact in the history of human errors, and a great proof of the power of imagination." It may be stated, incidentally, that Mesmer closed his parlors to the Commission, and they obtained their results from the parlors of one of his friends, Dr. Chas. D'Eslon. Mesmer then retired, and left France at the outbreak of the French Revolution, and died in England, in 1815.

Since then, hypnotism or mesmerism, as it was called, has become an established fact. Prof. Charcot, the famous neurologist, of La Salpêtriére, in Paris, commenced, in 1878, his investigations of the effect of hypnotism on hysterics, and demonstrated its different stages.

Another school is in Nancy, with Bernheim and Liébault at the head, and since July, 1886, there has been published a monthly journal, La Revue de L'Hypnotisme, with such contributors as Dr. E. Berillon, (the editor), Charcot, Luys, Voisin, Hack-Tuke, and others.

Hypnotism or mesmerism, of which somnambulism is the third stage, is that condition in which the will, self-consciousness, and sensations of the patient, are partially or entirely under the control of the operator, the subject losing, in most cases, all remembrance of what has passed during the hypnosis, but in which the subject, when hypnotized again, recovers the memory of the first hypnosis.

We will now consider the methods of producing hypnosis, which are as varied as the results. The ancient Egyptian sect, which I have mentioned, drew in the center of a white plate two triangles intersecting each other, and filled the figures with cabalistic words and signs. They then poured oil over the plate to make it shine more. After staring at the center of the plate for a few minutes, they entered the somnambulistic state. In Constantine, the members of the tribe of Beni-Aïaoussa sit down in a circle. After some time they begin peculiar swaying movements, until at last they spring up, their bodies dripping with perspiration, when with foaming mouths and in convulsions, they are absolutely insensible to pain, performing such feats as piercing their flesh with daggers, walking on hot irons, etc.

In Turkey, and Africa, there are to-day men who hypnotize themselves by staring intently upon their own umbilicus and pressing their tongue to the palate. After they are thoroughly under the hypnotic influence, they are put into an air-tight sack, which is sealed, then into a vault, which is also sealed and covered with earth, upon which grass is sowed. When the whole mound is covered with grass, the vault and sack are opened, and the man de-hypnotized, which is done by forcing open his mouth, pulling out his tongue, (which has settled into the pharynx), and then producing artificial respiration. Even after thus having been buried alive for months, the individual is said to be none the worse for his experience.

Other methods of producing hypnosis are to let the patient stare at a highly polished metal cap, or at a crystal, or any small object held at a distance of two to three centimeters before the eyes. A very good method, however, and one used by many operators, is Gessman's, which he describes as follows in his book, "Magnetismus and Hypnotismus": "I sit down opposite the patient, make her close her eyes, take her hands in mine, so that the four thumbs are pressed against each other, tell her to be quiet, and to yield unresistingly to the first inclination to sleep. When she has fallen asleep—generally within ten or twenty minutes— I increase the sleep by some strokings over her head and chest, and try to induce her to talk. This I easily achieve by placing one hand on her head and taking one of her hands in my other hand, while I, speaking towards the pit of her stomach, ask, 'Do you hear me?' which question must often be repeated four or five times before I receive a very weak answer." Now is the time for further experiments. Gessman uses a preliminary test to ascertain whether or not the patient is susceptible to hypnotism. This he does by telling her that in his organization there is a strong evolution of electricity, which enables him to electrize persons. He lets her seize with both hands two fingers of his right hand, and after some time asks if she feels anything. If she is susceptible, she feels a peculiar crawling sensation at first, and then a numbness in the upper part of the body. Then he says in commanding tone, "Hold my hand tight—tighter--tighter still—well! Now you cannot let go my hand"; and really she cannot. Blowing on the hands and telling her that she is free ends the spasm.

Thus could be enumerated many different methods; in fact, every operator has his own. Persons of a weak will are usually more susceptible than others. Take a child for example: When you, as a stranger, look at it fiercely and tell it "do this," it will do it, for it recognizes the superior will unconsciously, and that is only a mild form of hypnotic suggestion.

The methods of de-hypnotizing vary also very much. You may use the same methods employed to revive a patient who has fainted. The simplest method is to blow on the forehead. Some persons are de-hypnotized by the simple command, "Awake!" Or, if you tell them that they shall count from one to ten, and awake when they say five, they will do so, and then keep on counting (not knowing why), or else let the word six die out on their lips.

The many phenomena of hypnotism have been divided into separate stages and classes by different authors. We will only consider Charcot's classification. He accepts the following three stages: First, the cataleptic; second, the lethargic, and third, the somnambulistic; which are described extensively by Dr. Paul Richter,* a pupil of Charcot. The cataleptic state is produced by staring at some object, by a sudden strong light placed under the eyes, the sound of a gong, or a tremendous peal of thunder; also by sudden emotions, as fear, wrath, etc., when a person is for a shorter or longer time deprived of the power of speech or mobility. It also develops from the lethargic state when the already closed eyes are suddenly exposed to strong rays of light by the raising of the lids. It sometimes occurs before the narcotic state, during the administration of anæsthetics. A person who has been hypnotized is often very easily put in the cataleptic state by the clapping of the hands, the report of a gun, the sound of a gong, etc. An amusing incident illustrating this may be told here:

A woman had been suspected of stealing photographs from La Salpêtrière, at Paris, but upon being questioned, she absolutely denied it. One day she was surprised, standing motionless at the place where the photographs were kept, with one hand stretched out grasping one. It seems that a gong was sounded in the next room to hypnotize a person there, and this woman also immediately fell into the cataleptic state, which led to her discovery.

The characteristic of this state is immobility. The eyes are open and staring; respiration almost ceases; the limbs retain the most difficult positions in which they are placed; the skin is insensible to the strongest irritation, but the muscular senses, and those of hearing and vision partly retain their activity, and are susceptible to suggestion. Catalepsy ceases by a return to the normal condition, or by changing into the lethargic state. This state is produced by staring, or by continual pressure on the eyeballs. It can be produced from the cataleptic state by a simple closing of the eyelids. It is often preceded by epileptic phenomena, such as foaming mouth, asthmatic respiration or tetanus. The principal characteristics are complete insensibility of skin and mucous membrane, irritability of motor nerves and often insensibility to suggestion. Respiration is deep and quickened; limbs and body are perfectly relaxed. The muscles contract by stroking their tendon, and can also be excited directly. By opening the eyes the cataleptic state is reproduced.

The somnambulistic state is produced from the lethargic by a pressure or friction on the cranium. It is the one generally produced by magnetizers, and is characterized by absolute insensibility of the skin and mucous membrane. The senses are also sharpened, and the subject feels a certain personality, an ego, which may be illustrated by the following example: Before a patient in the cataleptic state are the requisites for shaving. They are touched by the operator and the patient at once begins to shave himself, but on being pressed on the cranium he stops and asks, "Why am I shaving myself?" I certainly do not need it!" On raising his eyelids he will go back to the cataleptic state and resume his shaving, but care must be taken that he does not cut himself, as he is absolutely insensible to pain. This state is produced by all methods which act on the imagination, and is especially susceptible to suggestion, which susceptibility is almost limitless, the actions of the somnambule often bordering on the marvelous.

Among the physical effects of hypnotism we may name the muscular sensitiveness in different stages, varying from the flexibitis cerea in the cataleptic state, to the spasm and tetanus following it. Indeed, the rigidity of the muscles is at times so great that magnetizers produce the cruel experiment of suspending a person in that condition between two chairs, in such a way that the body rests only on the extremes of the head and feet; and to show this power over the subject, the magnetizer sits with his whole weight on the thus suspended body. This experiment is the more dangerous, as it may produce tetanus of the respiratory muscles. Analgesia, or entire insensibility to pain, seems to be a characteristic of all stages of hypnotism; with a few exceptions, in the somnambulistic state, where it is not only absent, but where the sensibility to pain is often very much increased. In this hyperæsthesia may be found an explanation why the somnambulist may recognize things with his eyes closed, or walk in the most dangerous places with absolute safety. The slightest touch with a hair is accurately localized by him.

In the cataleptic state, the senses of sight, hearing, smell, and taste, may be affected by suggestion, and very amusing experiments are made; as for example, one may give the person a green persimmon to eat, and tell her that it is a good apple, upon which she will enjoy it very much. Or on the other hand she may be given a good apple and told that she is eating a green persimmon, when she will immediately make a wry face and eject from the mouth what is still in it.

Among the mental effects, we have in the first place that on memory. It is a characteristic that the deeply hypnotized person upon awakening remembers nothing of what has passed during the hypnosis, which, however, can be controlled by the operator.

If, for instance, you tell your patient that he will remember everything that has passed upon awakening, he will do so. Very peculiar hallucination may be thus brought about. We will take an experiment made at Nancy, for illustration. Mrs. A. is hypnotized by staring. While asleep she is made to believe that three minutes after awaking she will go and embrace a little peasant woman who is sitting in the corner of the room, and whom she then sees for the first time. At the moment predicted she goes and embraces the woman, who is quite astonished at this unexpected caress. When a moment afterword she was asked, "What did you do?" she answered, "I? Nothing!" "Yes, you embraced that woman!" "No, certainly not!" She had already forgotten what she had done. From this it may be seen, that commands given during the hypnosis will afterward be carried out unconsciously, and this has led to many serious cases of criminal actions. We all remember the historic trial in Paris a few years ago, when a woman murdered a man in obedience to a command given her while under the hypnotic influence. And this brings us to the dangers and abuses of hypnotism.

I will only cite a few cases to show that the hypnotized can be injured by hypnotism, and that he can be used against or without his will as a tool for the service of crime. The sleep produced by hypnotism is not a normal one, but a nervous pathological state, and as all abnormal conditions of the body must injure it in time, it is obvious that repeated experiments on a sound and healthy patient are more or less injurious, and have a tendency to weaken not only the mind, but the body. It may produce such a susceptibility that a subject will be brought immediately under the hypnotic influence by the slightest cause. There is a case on record in which a man became hypnotized on the street by a light from a carriage coming toward him, and he at once became cataleptic. Should that man walk on a railroad track and see the headlight of a locomotive, it may have the same effect on him, and he would lose his life.

The following is an experiment by Liégeois to prove that a person can be used for crime against his own will: A young man, 25 years old, while under hypnotic influence, was presented by Liégeois with a white powder, and told that it contained arsenic. "You will immediately go to your aunt; there you will take a glass of water, pour the arsenic into it, dissolve it well in water, and offer the poisoned drink to your aunt!" In the evening Liégeois was informed that the attempt at poisoning had been punctually performed. Thus we could enumerate many cases to show not only the good, but also the evils and abuses of this most wonderful art.

How can we apply it in medicine and dentistry? In medicine it has been used with great success all over the world. Insomnia, rheumatism, hysteria, etc., have been treated with its aid, and even amputations have been performed with absoute absence of pain. It may prove interesting to read Dr. James Esdaile's book on "Mesmerism in India," (London, 1846), in which, among other things, may be found a report of the medical and surgical cases treated by him with the aid of hypnotism.

In dentistry it has been used with more or less success. Many have been discouraged after the first few trials, but those who have carefully and with untiring efforts sought the benefits obtained by its use, have been rewarded with greater success than they ever hoped for. We all have had patients whose fear and nervous excitement was so great that it was difficult even to make a proper examination of their teeth. Just there hypnotic suggestion may prove of the greatest benefit. We can easily produce the first stage, and suggest quiet, absence of fear, and willingness to undergo any dental operation. This will aid the operator and patient very much, and hypnosis may be produced again after the operation, to suggest the same after the patient leaves the chair.

An inexperienced operator may simply suggest a tranquil frame of mind for the time being, and bad results may follow it. It is, therefore, essential to suggest that the patient shall feel absolute quiet and calm after the hypnosis, and shall not experience troublesome consequences. Too much stress cannot be laid on this, as the omission may bring on extreme nervousness, headache and disturbed sleep. The question now arises: Can hypnotic suggestion be used successfully to produce anaglesia during such minor dental operations as excavating cavities, extracting pulps, etc.? Dr. Thomas Fillebrown, of Boston, in his paper on "Hypnotic Suggestion as an Obtundent and Sedative," read at the World's Columbian Dental Congress, August 18, 1893, asserts that it can. For this purpose he induces the first and second degree of the Nancy School, and by constant repetition of "Sleep, sleep, you are resting, you are not suffering, you are not dreading it, you do not care for it, sleep, sleep, etc., he maintains the hypnotic sleep, which otherwise might discontinue as soon as pain is produced. One especially good feature of employing hypnotism for obtunding sensitive dentine is, that the lightly hypnotized patient in most cases shrinks from pain, though he may not feel it, and thus we have a guide to avoid the pulp, which we have not in any other method of allaying pain.

Dr. Gomer Sandberg, of Stockholm, issued in May, 1893, a pamphlet, Quelques, mots sur L'Hypnotisme, Stockholm, 1893, in which he describes the use of hypnotism for obtunding sensitive detine in a case he had on the 20th of December, 1889. A lady came to him to have two teeth filled, but the extreme sensibility of the dentine did not permit even the touch of an excavator. He hypnotized the lady, and then suggested no agitation during the operation, quiet and insensibility of the teeth. The last words he repeated many times. He then commenced his work, which lasted one hour and a half, and during which she was perfectly quiet, not experiencing any pain whatever.

In conslusion, I will say that the practice of hypnotism requires a great deal of care and experience, and that the hypnotizer should have a good medical knowledge, which, it may be said, the modern course in dentistry strives to impart to its student. Its study is not only interesting and instructive, but it is an art with which the good student of medicine and its various branches should make himself acquainted. With a firm will, and a determination to surmount all obstacles, the conscientious student of hypnotism, will pry into its mysteries, and, awed with wonder, exclaim with Shakespeare:

> " There are more things in heaven and earth
> Than are dreamt of in your philosophy!"

# COCAINE.

BY J. L. NEWBORN, D. D. S, MEMPHIS, TENN.

"Certainly," says an able editorial in the Cosmos, "the ghastly record of fatalities consequent upon the use of cocaine preparations is long enough to demand a halt, and that the use of this drug be placed on a clearly defined legal basis."

In two papers published by Dr. Mattison, medical director of the Brooklyn Home for Habitues, on cocaine poisoning, covering a period from May 23, 1887, to March, 1891, he cites thirteen deaths and nearly two hundred less lethal cases. In another paper, covering a later period, increasing the fatal record, he describes two cases: strong men, stricture; twenty minims of four per cent. solution of cocaine thrown into the urethra—not hypodermically—produced violent convulsions, and in spite of all efforts, death in four minutes. A young woman in the hands of a complexion artist suffered great pain from the application of a strong solution of carbolic acid to the affected part. To relieve this a four per cent. solution of cocaine was freely applied—not hypodermically. in a few minutes she became excited, said she felt strange, walked to the window, and fell dead.

He emphasizes the need of great care in all cases of cocaine anæsthesia by the following pertinent conclusions:

1. Cocaine may be toxic.
2. This effect is not rare.
3. There is a lethal dose of cocaine.
4. This dose is uncertain.
5. Dangerous and deadly results may follow doses usually deemed safe.
6. Toxic effects may be the sequence of doses large or small, in patients young or old, the feeble or the strong.
7. The danger is greatest when given under the skin.
8. Cardiac or renal weakness increases the risk.
9. Purity of drug will not exempt from ill result.
10. Caution is needful under all conditions.
11. Reclu's method, Corning's device, or Esmarch's bandage should be used when injecting.
12. Nitrate of amyl, hypodermic morphia, hypodermic ether, alcohol, ammonia, and caffeine should be at command.

History has repeated itself along lethal lines as regards cocaine so often, says the doctor, that it really seems surprising that any one at this day should question its powers for harm. It may not be known to all that cocaine has killed in a smaller dose than morphine, but that is a fact. It may not be known to all that cocaine has killed in a shorter time than morphine, but that too is a fact. "If, then, we have such a narrow margin of safety in the use of cocaine in accurately known doses, the use of a nostrum containing cocaine, in which the existence of the drug is either denied or is of unknown amount, becomes little short of criminality." In spite of this grewsome record, which is but a fractional per cent. of all its untold, therefore unknown temporary and permanent injurious and often fatal, after effects, yet "fools rush in where angels fear to tread."

I suppose that every State and territory and county and important town from Puget Sound to the Florida Keys, and from Wool-as-took to the Rio Grande, has been canvassed by the nostrum vender, selling to dentists the exclusive rights to use these dangerous cocaine compounds. Our offices are periodically flooded with fancy- colored leaflets offering to give us a half-dozen bottles of their secret "hell fired" stuff if we will send on three dollars for the best hypodermic syringe ever made, and two or three extra needles thrown in. Some of these seductive offers come from men claiming to be dentists. For references they often inclose pages of flaming certificates from men with "D.D.S." to their names. Often there are those with an easy conscience who have never learned to say no, but greedy of gain, and eager to double or quadruple their practice, with no proper knowledge of dentistry, ignorant of the most elementary features of the action of cocaine, therefore easy victims of the painless nostrum vender. These do not recognize the danger signals exhibited by distressed nature in the pallid cheek, the clammy brow, the labored breathing, and the wild, anxious stare. With a judicious admixture of "cheek," "gab," red rubber, and a hypodermic syringe loaded with something, they know not what, the ignorant public becomes an easy prey, upon whom is entailed, by a wholesale mutilation of the young and old, the loss of useful organs that should have been preserved through life, and a worthless substitute, as a perpetual souvenir of their stupendous folly.

## DIED UNDER GAS.

### MRS. JOSEPHS EXPIRED IN A DENTIST'S CHAIR.

Mrs. Flora Josephs, of No. 418 East Eighty-second street, died yesterday afternoon in the office of Dr. Robert Wolf, of No. 315 East Eighty-sixth street, while under the influence of nitrous oxide gas.

Mrs. Josephs, who was twenty-two years old, was the mother of a four-year-old boy. Her husband has for some years been employed as a salesman in a grocery store, but has been out of work for the last two months.

Mrs. Josephs went to Dr. Wolf's office about 3.30 o'clock yesterday. She told the dentist that she had been suffering for a long time from four badly decayed teeth, and wanted them extracted. She neglected to give Dr. Wolf her name, simply saying that Mrs. Steinhart, a patient of his, had sent her to him.

She was afraid of the pain of having the teeth extracted, and asked Dr. Wolf to give her gas.

### APPEARED TO BE IN GOOD HEALTH.

"I asked her if she had ever taken gas," said Dr. Wolf last night, "and she told me she had not. I questioned her closely about the state of her health, and made the usual examination to ascertain whether she could stand the anæsthetic. She appeared to be healthy in every way.

"Just before I administered the gas she said she would like to have her husband present, and I told her to go or send for him if she wished. She talked about it for a moment, and finally decided not to send for him.

"I administered the gas carefully, and noticed that she seemed to take it very easily. She fell to sleep very peacefully and kept quite still while I extracted the teeth. Just as I was finishing the operation, I noticed that she stopped breathing. I rang for assistance, and several ladies who live in the house came in. One of them called Dr. Churchill, whose office is next door.

### TRIED TO REVIVE HER.

"In the meantime I had given the patient repeated hypodermic injections of whiskey, and had lowered the back of the operating chair so that the blood would go to her head. When Dr. Churchill came in we tried artificial respiration, but with no result. Finally I gave her an injection of cocaine, and later more injections of whiskey. We worked hard for an hour to revive her, but it was no use."

When asked what he thought the cause of death was, Dr. Wolf said he believed Mrs. Josephs had some organic disease of the heart. The gas used was the same kind, he said, that he had used for four years.

Dr. Wolf did not know the dead woman's name, and after notifying a policeman, he went to the home of Mrs. Steinhart, of No. 146 East Eighty-ninth street. He was told that Mrs. Steinhart would not be home until 7 oclock. He then remembered that Mrs. Steinhart had a cousin named Charles Josephs, who lived at No. 418 East Eighty-second street.

No one was in the Joseph's flat when he rang the bell. Mrs. Simons, who lived across the hall, came out and told him that Mrs. Josephs had gone to Dr. Wolf's office in East Eighty-sixth street. She was taking care of Mrs. Joseph's child. This convinced Dr. Wolf that the dead woman was Mrs. Josephs. She was afterward identified by Mrs. Steinhart and Mrs. Simmons.

### DR. WOLF EXONERATED.

Coroner O'Meagher, who had been notified by the police, reached Dr. Wolf's office about 4.30 o'clock. After examining the body and questioning Drs. Wolf and Churchill, he gave a permit for its removal. The coroner exonerated Dr. Wolf from all blame, saying that the woman's death was purely an accident.

Dr. Wolf went to Joseph's house and told him of his wife's death. In the conversation which followed it was learned that Joseph, who is thirty years old, had been befriended by Dr. Wolf's father when he first came to this country from Germany.—N. Y. World.

(This is only another case in which the asphyxia produced by the gas was carried beyond the point or line for recovery. Whenever the affinity of the blood has been so weakened by deoxidation that it fails to take up the ogygen from the atmosphere, then the patient sinks, and all the powers of earth cannot restore to life.

This woman was in good health, but what of that if deprived of the force of life, which is free oxygen, as is always the case in getting absensation by the use of nitrous oxide gas. Therefore, as Dr. Richardson says, "its use should be prohibited by law."—Editor.)

# DIED IN A DENTIST'S CHAIR.

Mrs. Charles Grier died yesterday afternoon shortly after 3 o'clock while in a dentist's chair in the office of Billings & Sherraden, dentists. She went to have teeth extracted, and was put under the influence of chloroform. It was from the effects of chloroform that she died.

Mrs. Grier went to the office shortly before 1 o'clock, and was attended by Dr. Sherraden. She had two teeth pulled and then said that the operation pained her too much, and said she wished to be placed under the influence of an anæsthetic. Dr. Sherraden told her that he would not place her under the influence of any drug, and tried to induce her to continue the operation. Dr. Arnold, who has an office in the building, was called and examined Mrs. Grier. He told her that she could safely take chloroform, but refused to administer it. Then Mrs. Grier asked to have Dr. R. C. Moore, who had attended her in the past, summoned.

Mrs. Grier waited in the office until 2 o'clock, when Dr. Moore arrived. He examined her and advised that she be placed under the influence of chloroform by means of an Eismark inhaler. One tooth was extracted by Dr. Sherraden, and, as is usual, the pain brought the patient to consciousness. Dr. Moore again placed the inhaler to her face and the dentist extracted another tooth. Instead of struggling as she did before Mrs. Grier lay perfectly quiet, and Dr. Moore, who was holding her hands, noticed that she stopped breathing. As this is not unusual in such cases, Dr. Moore was not alarmed, and told Dr. Sherraden to hasten the extraction of another tooth, thinking that the pain would bring the woman to consciousness. The tooth was extracted, but after giving two or three gasps the woman lay dead.

This is the statement made by Drs. Sherraden and Moore. "I have placed hundreds of patients under the influence of chloroform in thirty years' practice," said Dr. Moore last night, "and this is the first time I have had a fatal result. If I had treated the woman in the old way, and as many physicians do now, by placing a handkerchief saturated with the drug under her nose, or dropped the drug from a bottle, I might blame myself, but I did not do that, and have not done so for some time. I used the latest method approved by physicians, the Eismarck inhaler. Moreover, I used a very small quantity of chloroform, less than a teaspoonful. I have attended the woman and never found that she was affected with heart disease, and I found her in a perfectly healthy condition when I examined her before the operation. I am anxious to have the case investigated, as I cannot see where I can in any way be blamed."

The inquest over the remains of Mrs. Grier will be held this morning at 11 o'clock. A post mortem examination may be held. —Omaha Daily, August 2d, 1895.

(The cause of this death—judging from the evidence herein contained—would seem to have been syncope with partial narcosis. Had the administrator on the discovery that the patient showed extreme palor and that the functions of life had in a measure ceased, quickly held the patient up by the heels and thrown cold water in her face, or had quickly applied the galvanic battery, she might be still living. But any delay in such cases is very likely to bring fatal results. By describing the effects of the anæsthetic to the patient before administering, ofttimes prevents the syncope as caused by fright. Ed.)

## TO SECURE RUBBER DAM.

A year or so ago Dr. Hetrick gave a hint as to the value of sand-arach varnish to secure rubber dam to the teeth, instead of the painful silk ligature. It was one of the most valuable items I ever received, and if it has not been universally adopted it should be. It is absolutely demanded that dentistry should be made as easy as possible, and any neglect is scarcely less than criminal.

Many patients in a country practice are so situated that a prolonged course of treatment for aching or ulcerated teeth is out of the question. When operating for such an one, and an exposed living nerve is found, it can almost always be successfully removed at once by injecting a solution of cocaine, under strong pressure, so that it is forced up to the apex of the root, otherwise the removal will not be painless. When a fragment of these fresh pulps resists all efforts of the broach to effect removal, the heating of the Evans root-canal dryer and passing up into the root brings the fragment away at once. The potassium and sodium compound of Dr. Schrier will also disintegrate one of these fresh pulps so it can be taken out at once.—Dr. Bergstresser.

# THE MEDICAL APPLICATION OF HYPNOTISM AND SUGGESTIONS.

JAMES R. COCKE, M. D.

BOSTON.

Hypnotism has received such recognition from the most celebrated Scientists of Europe and America that it is now commonly accepted as a scientifically established fact.

## HOW INDUCED.

The hypnotic state or states may be induced in a number of ways. The method of Mesmer by making passes over the head and body in certain definite directions has been perhaps the most popular in use by the public "mesmerists." The method of Nancy consists in directing the patient's attention to his eyes, telling him at the same time that his eyes are growing heavy, and that he is getting sleepy: then that he cannot keep his eyes open, and commanding him to sleep. The condition of muscular relaxation or rigidity is induced by suggestion according to the wish of the operator. Such suggestions as may seem adapted to the case are then made. These suggestions may be intended either simply to act during the condition of hypnotization or may be made so as act some time after this state has been dispelled (post-hypnotic suggestion). The hypnotic state may be also induced by commanding the patient to look at a bright object, watching the pupils of his eyes, and at the right moment commanding him to close them, telling him at the same time that he cannot open them. Then suggestions may follow adapted to his needs. There is a similar state called fascination, which consists in the operator holding the attention of the patient by directing him to look straight into his own eyes and then telling him to imitate any movement made by the operator. If the experiment is successful the subject will obey any suggestion, imitating any gesture or following any movement made by the eyes of the operator. In this state the senses of the subject are made phenomenally acute, and it is astonishing how quick he will obey even the slightest wish of the operator. Such experiments are familiar to most persons, but that hypnotism could be applied to the cure of disease has been recognized by the most scientific of the medical profession only at a comparatively recent date. Some of Charcot's experiments were phenomenal both on account of the clinical results and the suddenness with which he induced hypnosis. Some of his subjects would pass into the hypnotic state at the mere sounding of a gong, or to be hypnotized with a sudden bright flash of light. The hypnotic state may also be induced by music or by the rythmic stimulation of any or all of the senses. The susceptibility to the hypnotic state is greatest in childhood and in early adult life, and seems to diminish as the winter of life is reached.

## THEORIES OF THE CAUSATION OF HYPNOTISM.

There are three current theories to-day explanatory of the hypnotic condition. "Charcot's school agree in regarding hypnotism as an induced neurosis, closely allied to hysteria and therefore pathological, while the Nancy school refuses to see in hypnotism anything but a psychological condition, almost identical to natural sleep." (William Lee Howard, M. D.)

The third theory is advocated by Mesmer, which is that the hypnotic state is caused by a subtle fluid termed animal magnetism. From years of careful study I am convinced that hypnotism is the manifestation of a state which I term latent hysteria. A careful study of so-called spiritualistic phenomena, and states of ecstacy and catalepsy at religious revivals, has led me to the conclusion that the susceptibility to hypnotism consists in an inherent quality in the organism of the individual, which will permit of the independent activity of different portions of the mind, thus giving rise to separate and distinct states of consciousness.

Myers says: "My organism is the real basis of my personality; I am but still a colony of cells, and the unconscious or unknowable, from which my thoughts or feelings draw their unity, is below my consciousness and not above it; it is my protoplasmic structure, not my transcendental goal."

## CLINICAL RESULTS.

Hypnotism has proved beneficial in my hands in alcoholism and other drug habits, in certain forms of hypochondria, in certain types of hysterical paralyses, and in correcting imperative impulses.

Mr. ———, now railroad engineer, previously soldier in the United States army, had been addicted to the alcoholic habit for twenty-six years and had had periodical sprees, but drank more or less between times. When intoxicated was violent and combative. He was hypnotized first in January, 1889. I found great difficulty in producing deep hypnosis. The Braid method was used. Experimenting for forty minutes I finally succeeded in closing the eyes of the patient and suggested to him that the appetite for liquor would disappear when he was aroused. This was successful for a week. He returned and stated that he had a craving for liquor. He was again hypnotized and told that the craving would not return for twelve days, and was commanded to come to me at that time. He returned on the twelfth day and stated that that morning he had experienced a craving for ardent spirits for the first time during the period mentioned. The interval was lengthened, but so firmly was the habit fixed upon him that he could not be hypnotized so as to go longer than three weeks without the craving. He was hypnotized once a week during that year and has been under observation up to the present time, for he is still afraid to trust himself, although he has been six years without alcohol and has no craving for it. He is otherwise in good bodily health.

Hypnotism is of remedial value in certain forms of organic disease of the nervous system. A case is reported by Babanski. The patient had a post-hemiplegic lateral tremor simulating insular sclerosis, contracture of the left leg and arm and exaggerated reflexes. Hypnotic suggestion caused a rapid cessation of the tremor, relaxation of the contractures, return of the common and painful sensations to the left side, return of power to stand and walk without stick and with very little dragging of the limb.

The amelioration of all the symptoms continued for two years, during which time the man was kept in the hospital and occasionally hypnotized. He died at the expiration of this time.

The autopsy revealed foci of yellow softening in both hemispheres and other extensive changes in the occipital lobes and corpus striatum. Bernheim, commenting upon this case, believes that suggestion taught other nerve tracts to vicariously do the work of the ones destroyed, but Babanski believes that it only was of value in repressing the hysterical elements of the case.

I have hypnotized seven or eight hemiplegics with improvement in four. The most notable was a case of hemiplegia of the left side with aphasia. Patient could not call any ordinary article by its right name, and could not form two sentences consecutively. Inducing profound lethargy after the method of Liebault, I commanded him to read to me certain lines of poetry. To my amazement he read clearly and while hypnotized called articles correctly. When the hypnotic state was dispelled, the aphasia immediately returned and besides there were symptoms of hysteria. He was left for six hours and again hypnotized, and again read, speaking easily. The state was more gradually dispelled this time, and while he could not speak as well in his normal condition, he could make himself understood. He was hypnotized for four days—twice a day—and at the end of this time he spoke reasonably well, conversing fluently.

### HOW TO APPLY SUGGESTION IN THE HYPNOTIC STATE.

When is is desired to bring about a definite therapeutic result, it is well to give the suggestion in a way which will impress itself upon the subjective consciousness of the patient. Given a case of muscular rheumatism of the deltoid, after hypnotizing him I first suggest that the skin over the affected part is getting warm. I tell the patient that the pain is growing less, and that it is gone. Then I make other suggestions, telling him that he will sleep soundly at a definite hour, and that he can use the arm, directing him at the same time to do so while hypnotized.

In the various hysterical paralyses suggestion in the hypnotic state is very potent.

H——, girl, eighteen years of age, had been paralyzed in lower extremities for two years. Myelitis had been diagnosticated. As the electrical reactions were good and as there was no atrophy of the parts, I decided to try hypnotism. Faith, that mighty factor for good or ill, was so strong that at the mere contact of my hands she began to move her legs, and without waiting to be hypnotized at all, put her limbs out of bed, declaring that she was cured.

The manifestations of grave hysteria are amaurosis, anæsthesia, hyperesthesia and the paralyses. There seem to be two mental types found among hysterical persons. One type obstinately combats all forms of suggestion, while the other turns with avidity to anything which partakes of the marvelous. The latter class are the ones benefitted by any means which are skillfully directed to impress the psychic life of the patient. These are the patients cured by prayer, Christian science, or by metaphysical healing, in fact, any psycho-therapeutic agent.

## THE DANGERS OF HYPNOTISM AND PSYCHO-THERAPEUTICS.

The essential danger underlying the practice of hypnotism is the inherent instability found in a large number of minds, i. e., latent paranoia. A medico-religious sect among us tells us that we have no bodies, and that all disease is a delusion; as they express it, "it is merely a reflection of mortal thought." Another relies for the cure of all the ills of man upon prayer; another upon some one of the several special systems of treatment now so popular. The truth lies, as it has done in the past, between all these. Another danger in the use of hypnotism is the production of paranoiacs. Paranoiacal tendencies exist to a much greater extent among the masses than is commonly supposed. Certain it is that there is a large number of individuals whose mental equilibrium can be partially or wholly upset by anything which turns the torrent of their mentality in one direction to the exclusion of everything else. I do not believe that hypnotized subjects will ordinarily commit heinous and revolting crimes, as the result of hypnotic suggestion, but I am not sure that a few might not do so, therefore hypnotism, like every other potent agency, should be exercised with care and only under the supervision of skilled psychiatrists. From what has been said it follows that it would be difficult to lay down the exact contra-indications for the use of hypnotism, or to fix absolute limits to its utility. It is not likely to prove harmful when applied for therapeutic purposes, provided some care be used in selecting those to be hypnotized. Much has been written upon the subject of hypnotism as an anæsthetic in surgery. In certain cases it works well, but it can never take the place of ether, chloroform, and nitrous oxide gas.

Mr. ———, suffering with tuberculosis of the bladder and prostate, a suprapubic cystotomy had been performed for the purpose of draining the bladder. Subsequent to the operation the pain was intense, and, owing to the extreme nervousness of the patient, chloroform had been used daily for two months whenever it was necessary to dress the wound or irrigate the bladder. The patient could not sleep either with or without narcotics. I hypnotized him twice a day almost constantly for four months, and the bladder was irrigated without the patient experiencing pain. The crucial test came when it was found necessary to curette the bladder. A Boston surgeon examined and cleansed it thoroughly, and the patient declared to me that he experienced no pain, and.

had he not been informed would have never known that there was another surgeon in the house. Disease ultimately proved fatal, but his pathway to the grave was made easy and a life of wretchedness was changed to one of comparative comfort.

Hypnotism, then, is of value in cases where prolonged and repeated surgical procedures are necessary.

### SUGGESTIVE THERAPEUTICS WITHOUT INDUCING THE STATE OF HYPNOSIS.

The great popularity of Christian scientists and the success which attends some of their cases led me to try certain experiments.

Mrs. ——— was being treated for neurasthenia. She complained that she always awoke at one o'clock in the morning and that she could not again sleep. I told her, jestingly, that I would fix my mind upon her at one o'clock. I went to bed as usual and slept soundly. The next day my patient informed me that she awoke at one o'clock, but seeing my face bending over her, and hearing me command sleep, she slept soundly the rest of the night. She asked me if my mind was upon her. I had forgotten the matter entirely, hence the suggestion must have been the important factor. I have cured a large number of cases of insomnia by promising to think of them at a certain hour. It made little difference whether I did or did not think of them. The thought entered their minds and they slept.

The cures performed by the electric rings which are not electric, and magnetic bells which are not magnetic, and thousands of similar appliances, all go under the category of cures by simple suggestion.—Journal of Orificial Surgery.

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## INFLUENCE OF STATES ON THE BODY.

Professor Gates, of the Smithsonian, claims to have discovered that feeling, or mental conditions and states, produce chemical products that the harmful or beneficial—harmful if the products are the result of bad feelings, such as hate, envy, malice, fear, etc., and beneficial if the result of amiable feelings and good states. These beings, or malignant products, are discovered by chemical analysis of the prespiration and secretions of anyone under the influence of good or bad feelings. Just what use can be made of this discovery, if it be a discovery, cannot be foreseen at present. The discovery ought to warn people not to cherish black hearts—hearts black with hate of some one, envy, spite, revenge, malice and all that brood, for each of these feelings is a positive physical injury. Anyone can see this is so in the more violent outbreaks, both in one's self and in others, when, through passion, self-control is lost. Better put away all this evil brood, and if you cannot love your enemy, forget him.

# HYPNOTIC SUGGESTIONS AS AN OBTUNDENT AND SEDATIVE.

(Continued from No. 3, Page 217.)

That you may see my progress in the art of hypnotism, and better understand the anæsthetic effects of hypnotic suggestions, I give the following description of cases in my practice in the order in which they followed each other:

Case 1.—In 1892, my first attempt to hypnotize for dental purpose was Miss L., age twenty- two, to remove a pulp after arsenic application. She hypnotized in about one minute to the first degree; very light sleep. I suggested anæsthesia of tooth and pulp. It lessened the pain very much; but I could not overcome all the sensitiveness of the pulp, nor have I been able to do so since in any case. A month later I hypnotized and suggested for relief of toothache and restfulness, as she was very weary. I woke her in five minutes, and found her toothache gone and herself feeling entirely rested and refreshed .

Case 2.—Mrs. L., aged thirty-six. I induced only very slight sleep. I suggested for anæsthesia of sensitive dentine. The pain during the previous operation was almost unbearable. They relieved sensibility very much. It made the cutting of two cavities on buccal surface of inferior bicuspids with both excavator and bur very easily borne. The suggestion did not last long, and hypnosis and suggestion had to be repeated several times.

Case 3.—Miss C., aged fifty. The patient was suffering from necrosis from abscess on right superior incisor. Her upper teeth had been all extracted about five months before. The patient had nervous collapse seven years before, and has since suffered repeated attacks. Any excitement of sorrow, or joy, or fear, or a pleasant hour with callers, would bring on a nervous spasm which would last one or two hours. Ether had an unpleasant effect upon her, and she preferred the operation without an anæsthetic, on account of nervousness. I hypnotized her to the first degree, bordering on the second; I also applied cocaine to the gum; I then incised and removed a section of the gum; trephined the alveolar wall and removed spiculæ of dead bone. The operation lasted from seven to ten minutes. The patient lay quietly, scarcely flinching, her dread all gone, and upon waking up she pronounced herself comfortable during the operation, suffering no shock, depression, or weakness.

I did not think to suggest against subsequent pain, and some pain persisted in region of the wound, also in her temple and ear of same side. I hypnotized her the second time, and relieved the pain in wound and face. I waited twenty minutes, thinking the rest of the pain would subside; but the pain in her ear persisted. I hypnotized her the third time, and suggestion relieved the pain entirely, and the patient left my office feeling in very much better condition than before the operation. I saw her six days after; she had been getting along well, the wound was healing well and her nervous condition good; had some neuralgia of the head, face, arm, and hand. I hypnotized her, and suggestion relieved the pain entirely. Three days after this she had had no return of pain in arm or hand, had suffered a little pain in the head, and suggestion relieved it again completely. At 4.30 called again. She had been very busy during the day out in the wind, and tic of right temple had returned and involved the eyes. I hypnotized twice, and completely relieved the trouble. The patient left town the next day, but subsequently I saw her and found relief from the pain proved permanent, also the general good effects of the hypnotism continued.

Case 4.—Mrs. P., aged forty-five. Right superior first molar abscessed. The crisis was past, but the tooth was very sore, the dead pulp remaining. The tooth needed drilling for removal of pulp. The patient dreaded the operation very much; she did not sleep the night before on account of it, and had a bad headache and neuralgic pains over the entire system. She hypnotized to the second degree; her dread was entirely gone. She suffered scarcely any during the operation; she was very comfortable and did not mind it at all; her systemic pain was also cured. I filled her tooth temporarily and hypnotized again, and suggested recovery without further trouble.

Four days after, I found her tooth in good condition, and filled it permanently; I hypnotized, and suggested for continual health of tooth and system. The tooth has since remained well.

Case 5.—Prof. O., aged thirty-five. Right inferior first molar needed to be extracted, as it was badly abscessed. I hypnotized him to the first degree, and suggested that pain of extraction would be lessened, his dread removed, and shock prevented. The result fulfilled the prophecy.

Two weeks later he had a right superior bicuspid root which he had wished out for ten years, but he could not get up his courage. I hypnotized to note the effect on his mind; he soon opened his mouth without dread; I extracted the tooth; he said he felt no pain, only a little wrenching sensation, which was only local. He called it perfectly successful.

At another sitting I excavated and filled the right inferior lateral and cuspid; these were very tender indeed. I hypnotized him, and suggestion relieved sensitiveness very much, and with a local obtundent added I made the anæsthesia complete. The patient said the pain was only local; did not disturb the system. He found it a great relief.

Case 6.—Dr. P., dentist, aged thirty- four. I filled for him a right superior cuspid, labial cavity, exquisitely tender. He was unable to bear the finger nail on it. I hypnotized him to the second degree, light; suggestion made the anæsthesia of the dentine almost complete; the nervous and muscular relaxation was entire. I used excavator freely, and burred with engine all around the cavity, and in twenty minutes from the time he sat in my chair the cavity was prepared. He found it a complete success. I subsequently filled for him a right superior cuspid, mesial cavity, not tender; I did not hypnotize him at first. When the tooth was nearly filled, he said he felt broken up and was very much disturbed. I hypnotized him: suggestion made him immediately quiet and entirely relieved his discomfort.

Case 7.—Master G., aged ten. The patient was very sensitive and it was very uncomfortable for himself and all concerned. He hypnotized to the first degree, very light. It quieted him a good deal, and made it possible to do a little, but my success was indifferent—largely due, I think, to lack of interest on the patient's part, whose mother had little faith in it. I hypnotized him for three sittings with about the same success.

Case 8.—Mrs W., aged forty-three. Filled right inferior first molar, very sensitive. This patient was always very much disturbed by prospect and performance of dental operations. She hypnotized readily to the first degree, but full influence could be maintained but a little time. A drowsy feeling persisted; all dread of operation was gone; I used bur and chisel without resistance or suffering on her part. She thought it a complete success.

A week after I hypnotized her with same process as before.

I could not completely anæsthetize the dentine, but the addition of a little alcoholic vapor completed the insensibility.

Case 9.—Mrs. C., aged twenty-nine. Condition, hypnotism, and success the same as last case.

Case 10.—Miss H., is a lady about forty. Her teeth have been always very sensitive, and for twenty years she has been troubled with insomnia; she was very nervous, excitable, and apprehensive. Her teeth were in bad condition, owing to neglect on account of fear and pain. She hypnotized to the third degree, somnambulistic. I suggested anæsthesia of dentine, which was complete. I operated April 9, 12, 21, and May 7 and 16. Hypnotic suggestion at each sitting.

May 28, I gave her a short hypnosis at the beginning of the sitting, and one at the end, operating in the meantime on a post-hypnotic anæsthesia which was complete. This method gave relief and comfort; some of the former hypnoses had proved wearisome. The incidental benefits derived from the treatment were very marked. Up to date of her first sitting she had often been obliged to take some hypnotic to afford sleep. The night after her first hypnosis in the afternoon, she slept all night and far into the morning, and every night since, except three or four that she had some face-ache. Her general condition is much improved, apprehensiveness much less, and nervousness much reduced, and has much better command of herself. Her improvement has persisted up to the present time (July 1, 1893).

Case 11.—Mr. M., aged thirty-two. Teeth very sensitive. Hypnotized to the third degree; suggestion made; anæsthesia of the dentine complete. Operated from an hour to an hour and a half at each sitting. At the close of the longer sittings he complained of feeling tired sitting so still; he thought an hour long enough.

Case 12.—Miss P., aged fourteen. A refined, healthy, vigorous girl, but so afraid of dentistry that she had not been able to have teeth cleaned for two years. Her teeth are extremely sensitive. She called upon my promise that I would not touch her teeth. I talked hypnotism to her, interested her, and made an appointment to try it and operate.

May 28, I hypnotized her to the first degree. Suggestion removed all fear, and I cleansed her teeth without trouble, and prepared and filled with cement two cavities in the front teeth.

June 11, I hypnotized her again; prepared and filled with cement four cavities in front teeth. While excavating one of the cavitites she flinched some. I feared discouraging her, and waked her and asked her if I should go ahead if it did hurt a little; she said, "I don't care; go ahead!" I hypnotized her again, and finished according to instructions

June 17, I hypnotized her twice; excavated three cavities and filled with gold; I used bur with engine without discomfort to the patient.

June 18, I hypnotized and prepared one tooth, waked the patient and filled it; then prepared and filled another molar while she was awake. The transformation was wonderful.

Case 13.—Miss L., aged forty-two. She called on me in December, 1891, for a new upper plate. She had been wearing artificial teeth on rubber for three years. Her mouth had been constantly red, with severe itching and burning. I made her a good-fitting plate on rubber, but her mouth was no better. A few weeks later I made a gold plate, which she has worn since. It gave no relief from the burning, and the redness persisted.

June 23, 1892, she called, seeking relief. I proposed hypnotic suggestion as an experiment. She was agreeable to it. I hypnotized her nearly to second degree. Suggested cessation of burning and change of color and return to health. She slept perhaps ten minutes. On waking the mouth had changed color perceptibly, the burning had gone.

June 24. She has experienced discomfort only about one hour the evening of the 23d, and again that morning about the same length of time. I hypnotized again and suggested for health and comfort.

June 25. She has experienced a little discomfort once for a short time since yesterday. Mouth still better. I suggested for complete recovery. I did not see the patient again until the 29th, four days intervening. Has had hardly any burning of the mouth since her last visit until to-day, rather more. Mouth seems much improved in color and texture. Hypnotized, and suggested for relief and cure.

June 30, mouth much better; no discomfort since yesterday. Hypnotized also on July 1, 6, 7, 8, 14 and 21. July 22, her mouth has felt entirely well since June 30; it is now normal in color save two small patches which are a little red, but not at all tender or uncomfortable. The patient has worn her plate all the time during the treatment.

These cases fairly represent the extremes and averages of the results in my practice of the application of hypnotism to dentistry. I believe it is a power of great value to my patients, and may be to the patients of other operators who practice it.

THOS. FILLEBROWN, M. D., D. M. D.,
Boston.

# MENTAL SUGGESTION.*

"It is the province of science to discover and declare—not to imagine; to see and to hear and to testify that which has been seen and heard, and not to assume the role of novelist at the very point where novelty should end." During the past few years many of the leading minds of the medical profession have been busy with the subject of mental suggestion in two ways; one class has undertaken to find the law upon which the science could rest or could be constructed or explained; the other class has been content with the exercise of the inherent power of suggestion as indicated by the influence that could be exerted on the subjective mind.

In this short paper I must refer to mental suggestion as the simplest and most common form of the complex subject of hypnotism—the mere oral commands or the influences that are used to convey the objective wish to the subjective minds and the various influences that work in harmony to inspire credence and action. At the present time it is safe to say that scientific accuracy has not been reached in this branch of mental therapeutics and that the role of novelty and romance is still being exhibited. This subject has wonderful fascination to the medical mind, and the deeper the plunge into the mysterious, or the greater the play of the fancy, the more inexplicable becomes the theme when taken in the sense of a serious study out of which some sort of system or science may be evolved from the great confusion. So common has the subject become of late that the profession and laity seem equally credulous in believing the wonderful stories that are constantly being printed. Fiction and actual experiences seem interchangeable, until now the subject is boundless. I have only generalities to deal with, for the various forms of practice and experiments would occupy too much time.

My first generalization is that the successful practicing physician is to a certain extent a conscious or unconscious hypnotist. The physician is conscious if he, knowing the requirements of the art, deliberately selects and uses mental suggestion alone or in part, complying as he should with the fundamental requirements, and expects and sees proofs of the advantages of this form of treatment. Such a practitioner has this art added, not as the cure-all, but as an accomplishment or adjuvant to his medical skill. Such a one knows that the theory and the practice do not follow fixed lines of practice at all times and that uniform results do not always follow. His perceptive faculties clear up for him the field for this kind of treatment. The successful physician who is still unconscious of the power of his ability to cure by mental suggestion has acquired the practice through familiarity with results, but has never deliberated as to the why. He unconsciously uses the same facilities, but selects them from a different standpoint of practice. To him it is the place of treatment and that ends it.

Mental suggestion, when it is intelligently and actively employed, is always effective, (1) when the object mind cannot be moved against reason or the evidences of all the senses or positive knowledge, by the suggestion of another and (2) when the subjective mind accepts without hesitation or doubt all the statements made to it, no matter how incongruous or how contrary to the objective experience of the individual. Carried to its ultimatum this mental suggestion means that the subjective mind is always amenable to the power of suggestion by the objective mind. This is the experience of the conscious hypnotist. To give this control, to use this influence and to apply it to the physical advantage of the patient is one of the problems that is now being added to the curriculum of the medical practice.

I apprehend that one great cause for all this is that no two persons have exactly the same experience or have observed exactly the same phenomena. Each practitioner must draw his own conclusions from the limited field of his own experience. This bewildering hodge-podge of opinions has its origin in personal experiences, and when it comes to the expression of this opinion it is made to seem that the entire world rather than the one little world with one little self as its center is involved.

The Society d'Anthropologie of Paris, through one of its members, M. Duroo de Gros, has recently presented this proposition for study, viz., that an individual is not a unit, but composed of as many animals as the body contains cells. Thus a being is a concentration of many distinct animals. This may yet be the key to unlock the mysteries of the hypnotist, proving that it is not the objective mind save as it can and does outnumber its subjective victim by force of numbers. The objective is dominant by physical power rather than through weakness of the subjective. It is an outnumbering arrangement. It has been said that if there were only two people in a community one would be the leader, the other would be led; such is the relative activity, mental and physical—the objective and subjective mind again. In large communities there is the active struggle for leadership; it grows fiercer as leaders strive to lead leaders. The followers are passive and can be driven. No two people see the same picture or can describe exactly the same scene, and in matters pertaining to mental activities agree as to exact causes or remote results.

This leads us to the second generalization; the personal equation and the forms of diseases that are known to be susceptible to cure by mental suggestion. So far as relates to mental therapeutics, not such a very different name from mental suggestion in the sense we are taking it, the relative position is the most favorable to the practitioner. The patient appeals or is brought into his presence with the thought uppermost that here it is that I am to find relief or change or cure. The personal differences are great and are increased by vision, what each sees, by movements performed by each, and what is said and heard. The dress and address of the doctor, the presence of his libraries and apparatus, the immediate surroundings, luxurious or plain, and the immediate mental accord, all tend to make the distinction greater; the one becomes the operator, the other the subject, and each by common consent. As a matter of fact, these are accessories only and do not reach the real subject. The present advanced standard is also a departure from the popular idea that the subjective mind is under the influence of the objective as a product of the will. There is less of the "I will!" than formerly, and it is extremely probable that it is not the strong will that helps suggestion so much as the clear thinking, for to be profitable it must be both given and received as definite as the entity itself. The failure to have positive data necessarily means a lack in suggestion; the patient may lend himself to the action, listen, seek mentality, and not find.

By common consent, the class of cases amenable to treatment by mental suggestion is not large. This consent is based on experience, and it is here that the individual efforts of any one practitioner working alone or with single patients seem to be of such little service in the solution of the great question; it is only when the opportunities are large that great or rapid progress can be assured. like the remarkable clinic of the lamented Charcot, where hundreds came daily and were touched by his wondrous skill. It is being determined that it is not alone in the class of neurotics that suggestion is most serviceable. Hysteria was once the disorder that oftenest attacked and that, too, on the most superficial study; it was styled nothing but nervousness, and the patient was fit for punishment and not sympathy. As a matter of fact hysteria is amenable to mental suggestion only under very favorable circumstances so far as general practice is concerned. It is found that mental suggestion is capable of controlling the circulatory system, the respiratory and the muscular, sensory and motor systems to a marked degree, not for long periods of time, but momentarily or in some cases at the operator's will. This check or change is not unlike the action of galvanism or the interrupted current, and is a favorable change in breaking up abnormal physiological action. Dypsomania as a disease is coming under the control of suggestion through the physical sense. The moral suasion is all right, but the drinking patient is sick. and the moral and physical nature seeks a master outside of self.

Why read all of these generalizations concerning so vast a subject in this bureau of gynecology? It is not intended to exclude the influence suggestion has over diseases or disorders in children or in males, but to say that what is known of the subject, the highly endowed sensitive nature, the exquisite mental balance in health, the capacity to enjoy or to suffer and the refinement of sensory and mental natures, that the great field of mental suggestion is rapidly widening, so that hope to the sick women may be given along with the harmless drug, and that in its highest sense suggestion may be a permanent factor in the curriculum. There are some signs that make its future a great possibility.

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To Lessen the Pain from Arsenic.—Mix equal parts of antipyrin and arsenic. The antipyrin diminishes blood-pressure and relieves the congestion caused by the arsenic, and therefore diminishes pain.—G. C. Richards.

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Hayes Hypnotic has made such an unparalleled record of safety, having been administered to over 400,000 persons to date without a single death. Medical savants are simply astounded at the results.

# THE DENTAL AND SURGICAL MICROCOSM.

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## VENGEANCE VERSUS "ETHICS."

### OPEN LETTER TO THE MEMBERS OF THE FORMER NEW ENGLAND AND THE CONNECTICUT VALLEY DENTAL ASSOCIATIONS.

Gentlemen: Having been invited by the regularly appointed committee of your joint Dental Meeting, held in Worcester, Mass., Oct. 23-25, and noted upon your program to deliver an address or paper on the "Art and Science of Anæsthesia," and also to give clinics in anæsthesia, with the use of "Hayes' Process of, and Apparatus for Generating and Applying Anæsthetics," I remained in the East several weeks longer than I otherwise should have done, only to learn, when I presented myself for the purpose of filling my appointment, I had been denied the performance of this duty by the act of a caucus made up of certain members of your associations, who were writhing under supposed grievances; I was further informed that I was deprived of the privilege of self-defense, a right universally conceded in every properly regulated society, and in every court of justice throughout the civilized world. Hence through the columns of the Dental and Surgical Microcoism, I claim your attention, and that of the profession at large. I am well aware that the majority of your members did not understand, to say the least, the exceeding injustice of your action. Had the right of defense been granted, a right never before denied by a respectable body of men, you doubtless would not have allowed the stigma of imbecility to rest on the escutcheon of your associations. True, I might have gone into your joint meetings and have demanded the right secured to every citizen by our government, and protected by the laws of the State of Massachusetts, the right to protection of character and life, and have insisted then and there on a proper hearing and justification. This would have further disturbed the harmony of your meetings, and it seemed advisable, for the present, to await this time and means to set the facts before the dental profession. In this I stand approved; and by the local press of Worcester, the self-restraint and composure of my conduct is contrasted with the restless manner of certain members of your body, as will be seen by the following extract from the Worcester Telegram: "Dr. Hayes has been a constant attendant at the meetings, and his composure contrasted with the evident uneasiness that his presence caused some of the members."

By reference to the program, it will be seen that my paper was, by appointment, to be discussed by prominent defenders of nitrous oxide gas as an anæsthetic, one of whom was a conspicuous actor in the late celebration of Dr. Wells as the discoverer of anæsthesia.

From time to time, in numerous articles relating to these subjects, I have controverted and denounced as untenable the position assumed for the so-called discovery of anæsthesia by the advocates of nitrous oxide gas, and by undeniable facts stated, I have pronounced the acts as preposterous and detrimental to the standing of the profession before an enlightened world. In these articles reference was necessarily made to the Conn. Valley Dental Association, as well as to the American Dental Association, in their unjustifiable effort to popularize nitrous oxide gas. I also, in emphatic terms, showed the absurd fallacy of their attempt to foist upon Dr. Wells the discovery of anæsthesia. By my unprejudiced and honest work in the interests of the science of anæsthesia, it evolves that I have incurred the displeasure, not only of those who were to discuss my paper, but also of many of those who have made themselves noticeable in thus carrying out the designs of the syndicate of Dental Dealers. Nay, not only does this displeasure and resentment seem to exist, but I am definitely and distinctly told by some of your members, and by one of the joint committee on the program, that the exposure through the columns of the "Dental and Surgical Microcosm" was the real offense for which I was to be decapitated. Innocent as a lamb, I was led to the guillotine and the axe was applied; but it failed to decapitate. I still live, and I live to be heard.

The ostensible offense with which I was charged proves to have been because the Hayes Dental and Surgical Manufacturing Co., of Chicago, a body incorporated under the laws of Illinois, and governed by a Board of Directors, has advertised its goods, and, in particular, the Hayes' Process of, and Apparatus for Generating and Applying Anæsthetics, and by so doing the Company has violated the Code of Ethics; hence I was to be excluded from the privilege of the floor.

It is a matter of surprise to the officers that the Company is subject to a "Code of Ethics" promulgated by an associated body of professional men, of which it is not a member, neither has any desire of becoming such, or of having any voice in their government. Besides, other Dealers in Dental Supplies have never had similar methods of advertising their goods called in question, except a few years since, the instance of Dr. Land, of Detroit. Not a member of the Syndicate of Dental Dealers has ever been questioned or restricted by your bodies in reference to advertising, nor have their professional representatives been excluded from your programs or denied the privilege of the floor.

A second offense with which I was charged seems to have been because the Hayes' Dental and Surgical Mfg. Company has, in a few instances, sold Exclusive Rights to Dentists and Physicians, for the use of the Hayes Process of and Apparatus for Generating and Applying Anæsthetics. This seems to have been particularly offensive to the member who introduced the resolution to have my name removed from the program, and to have me denied the privilege of the floor, as the Hayes Dental and Surgical Manufacturing Company had recently sold an Exclusive Dental Right and License for the use of the Hayes Process and Apparatus in his town. Hence, because I was identified with this Company, it would be a violation of the "Code of Ethics" to have me address them on a strictly scientific subject, or to give clinics in the art and science of anæsthesia before their honorable ethical body with the use of the admitted most scientific Process and Apparatus ever brought before the dental profession.

I did not for a moment presume the H. D. and S. Mfg. Co. was solicited to give an address, but understood myself to be invited on account of my supposed qualifications, as an honorable professional man, to instruct in this art and science, as I had frequently done, both before Dental and Medical Societies and Colleges. For these reasons I supposed it to be that I was desired to give my services to this convention of dentists, which request I granted, free of charge. As all know, who have heard them, my lectures on this subject are strictly scientific. It would not have been absolutely necessary for me to allude by name to the Hayes Process, though it might have aided greatly in presenting the science as well as the art. Consider, for a moment, the "ethics"(?) of an honorable body of professional men, who invite, through their properly constituted and legal authority, a professional brother to address them on a subject in which, by their own act, they have conceded he is qualified to instruct, and then, for no other reason than that he had refuted the public teachings of some of their members, and criticised the fallacious claims foisted upon the profession; then, when, at a sacrifice of time and interests, he comes to perform the duties assigned him, not only refuse him the opportunity to do this, but deny him the right, even, of self-defense, because, as they allege, their "Code of Ethics" (?) would be thereby violated. Ethical conduct is based on the golden rule of right and right-doing.

If such construction of "the code of ethics" be upheld by the dental profession, better were it plunged into the depths of the sea. If unscrupulous men in any profession use the code of ethics as a justification of selfish ambition and desires, it becomes a menace to that profession, and the sooner it is sunk into oblivion the better for all concerned.

Note, first, in this act of your joint proceeding, your associations have undertaken, not only to dictate to the H. D. and S. Mfg. Co., a corporate body, how they shall conduct their business, but by your overt act toward the representative of the company, while in the discharge of the duties you had assigned to him as a professional man, and not as the company's representative, you claim the right of interference and chastisement.

Note, secondly, in so doing, you have not only violated the civil law of the land, and made yourselves liable for damage, but you have cast a stigma on the profession to which you belong. It would seem that an honorable body would have waited until a considerable number of the membership should be present before organizing themselves into what they were pleased to call "a committee of the whole." Not only this, but they would have waited till my arrival, and in my presence would have taken action. Nothing of this kind was done: opportunity was seized, even before the arrival of him whom they had decreed to decapitate, and action was precipitated when not an opposing voice could be raised in opposition to the base deed.

Who can fail to see vengeance hiding in such an act under the guise of ethics? While full four-fifths of the membership of the Joint Associations had no hand directly in this proceeding, yet before the public, as members of the Societies, it is to be regretted all must be held responsible for this injustice and insult to professional honor and courtesy.

This resort to "gag law" when the advocates of nitrous oxide fail to maintain their position, and their evident fear to enter into a discussion of its merits before an intelligent public, are emphatic evidence of the tottering weakness of the cause espoused by them.

Would it not have been more rational and "ethical," as well as honorable and dignified, and yet business-like, for your joint associations to have passed a resolution (if you felt aggrieved and injured at the sale of Exclusive Dental Right Licenses for use of Hayes' Process and Apparatus), expressing your regrets and the injury and injustice that you think would result to the profession at large, and at the same time request in proper terms your desire for the extension of the sale to all members of the profession who might desire to purchase? The Hayes Dental and Surgical Manufacturing Company would have, no doubt, considered your request and have endeavored to comply with the same.

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The New Hampshire State Dental Association met at Manchester, October 14th-16th, with quite a good turn out of the membership, imbued with a keen sense of the responsibility of their high calling, and, as is usual with them, had not only an interesting and profitable meeting, but a very enjoyable occasion. The "banquet," which seems to be a prominent feature of their annual meetings, as usual, was a royal feast of viands and enjoyable toasts.

The reader will note the new cuts of the Hayes' Apparatus for Generating and Applying Anæsthetics in the advertisement of the H. D. & S. Mfg. Co. in another column. While the Process is essentially the same as formerly, yet the Apparatus is thought to be in the highest perfection of art and much more efficient than the former. Besides, the Apparatus can readily be understood, and the practical working of the Process easily explained by printed instructions which accompany every License. The narcotic chamber is made perfectly gas tight, and hence there is a great saving of material when not in use. Moreover, the handsome nickel-plated cup that goes with it for the reception of the Generator when not in use adds to its convenience and beauty very much. Then there is also a nickel-plated wire cleet for the Aerator when not in use. The whole outfit is the most unique and convenient device ever brought into a dental or physician's office.

Now is the time to subscribe for the Dental and Surgical Microcosm for 1896. The Fifth Volume begins January, 1896. Cut out the slip on first page of this number, fill in your name and address, and enclose it with $1 for next year's subscription. While the subscription list more than doubled last year, we want to do much better the coming year. Those interested in the development of the Art and Science of Anæsthesia and in hypnotic anæsthesia, from the most modern researches, we shall hope will be interested in diffusing the literature pertaining thereto.

The issue of this number of the Dental and Surgical Microcosm has been unusually delayed by the absence of the Editor in chief; he being in the East much longer than he intended. It is to be hoped that no such delay will ever again occur.

## OBITUARY NOTES.

In the death of Dr. James E. Garretson, the profession loses one of its most eminent members. Educated, principally, in Philadelphia, nearly all of his professional life was spent here. Renowned as Dean of the Philadelphia College of Dental Surgery, as an author of no ordinary merit, both in works pertaining to dentistry, and those of a more general character, widely known as "The greatest oral surgeon of the world," yet a sketch of Dr. Garretson would be incomplete were no mention made of his kindness, tenderness, and ever-abiding sympathy with the suffering, as well as the courage which enabled him to perform the most extensive operations with unequaled skill.

A lover of philosophy, Dr. Garretson's productions are tinged with profound philosophical tone. This is apparent in his books and addresses. Of him it may well be said, "He lived that the world might be benefitted by his presence in it."

The Dental Department of Harvard University is deprived of one of its illustrious members in the death of Thomas H. Chandler, A. B., D. M. D. Having received collegiate training before the study of dentistry, he was well adapted to maintain the advanced standard he advocated for the dental profession. His aim was high, his achievements great; but better than these, he was ever ready to assist those who sought his aid, and took pleasure in acquiring knowledge that he might impart it to others.

## HAYES PROCESS OF ANÆSTHESIA.

For those desiring information relative to the Hayes Process of Anæsthesia, etc., we, by permission, refer to the following who have been using this Process for considerable time, and know something of its merits:

G. P. Wiksell, D. D. S., Hotel Pelham, Boston, Mass.
Frank L. Marshall, D. D. S., " " " "
Chas. W. Veo, D. D. S., " " " "
Lewis N. Veo, D. D. S., " " " "
Fred M. Hemenway, D. D. S., " " " "
Drs. Pierce & Horr, D. D. S., " " " "
J. E. Hale, D. D. S., " " " "
E. B. Davis, D. D. S., Concord, New Hampshire.
Geo. C. Duncan, D. D. S., E. Jaffrey, New Hampshire.
J. S. Canili, D. D. S., Bridgeport, Conn.
Wm. F. Gerish, D. D. S., " "
Chas. B. Erickson, D. D. S., New Britain, Conn.
Wm. H. Baxter, D. D. S., Northampton, Conn.
J. M. Thompson, D. D. S., Lewistown, Pa.
J. C. Duncan, D. D. S., Johnstown, Pa.
H. A. Rainey, D. D. S., Centralia, Ill.
S. M. White, D. D. S., M. S. A., Benton Harbor, Mich.
J. M. Clyde, D. D. S., M. S. A , Springfield, Mo.
Prof. J. B. Cigrand, D. D. S., 1244 Milwaukee avenue, Chicago, Ill.
Edward Pittwood, D. D. S., Spokane, Wash.
Prof. Fred J. S. Gorgas. M. D., D. D. S., 845 N. Enton St., Baltimore, Md.
Drs. Edwards & Son, Des Moines, Iowa.

Or any other Licensee.

Over 600,000 have up to present time been anæsthetized by this Process, etc., and for various surgical operations without a single accident. Thus the claim for "absolute safety" by the Hayes Process and Apparatus has been verified in such a manner that no man will risk his reputation in the old hackneyed expression, "That all anæsthetics are dangerous." A true anæsthetic is never dangerous. An asphyxiant or a parylisiant may kill, but never a true anæsthetic.